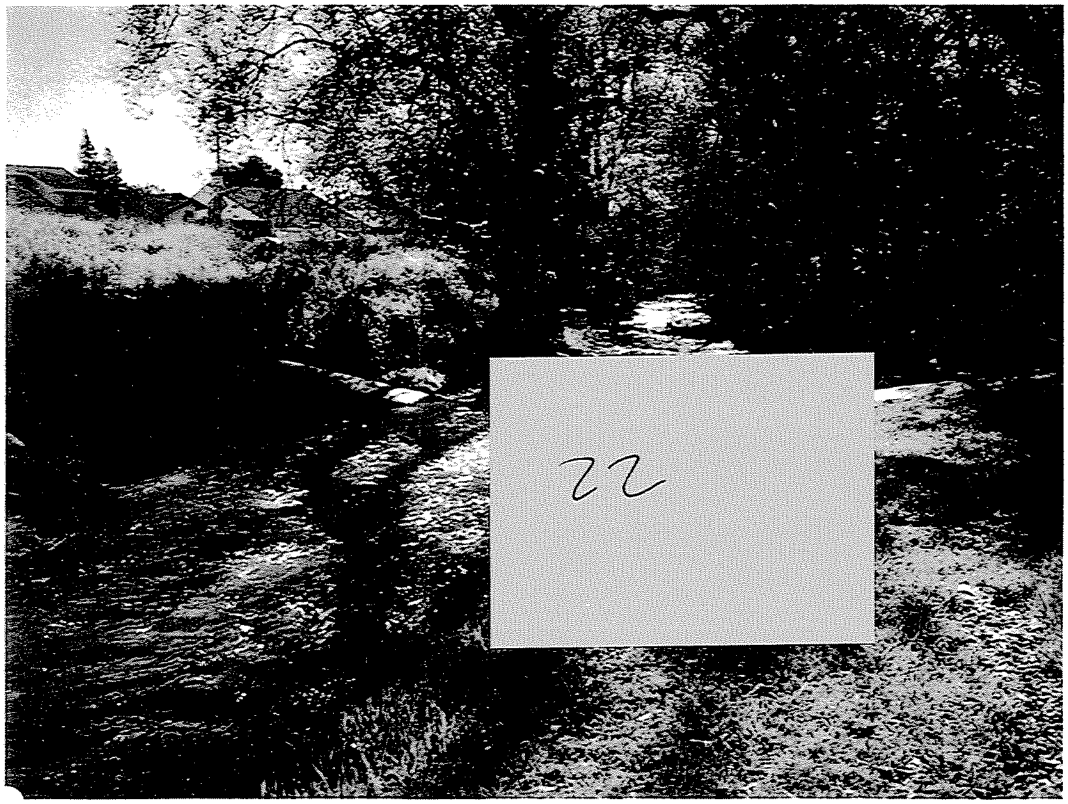
Santa Clara Valley Water District

HYDROLOGIC GAGE STUDY

Project Number 62042045

Final Report on Evaluation of Existing Hydrologic Gages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July 2010

Photo: Upper Penitencia Creek downstream of Piedmont Road, Stream Gage No. 1

Rev. July 21, 2010

TO: Distribution

FROM: James C. Wang

SUBJECT: Hydrologic Gage Study
Report on Evaluation of Existing District Gages

DATE: July 27, 2010

As part of determining the conditions of all streamflow and precipitation gages throughout the Water District, engineering and hydrographer staff from the Coyote and Pajaro Watersheds Division recently completed the evaluation of existing streamflow and precipitation gages for all watersheds. This evaluation is the first of seven phases to initially determine the adequacy of these gages with the target goal of developing and improving the overall hydrological gage network District-wide. The ultimate objective of the study is for the District to have a reliable and defensible means of measuring and collecting streamflow and precipitation data to support internal, as well as, external water resources needs.

Of the 78 active streamflow gages evaluated, 41 revealed inadequacies to their function. These gages were evaluated based on their adequacy and reliability to measure flow data during both low flow and high flow periods. Improvements to the function of streamflow gages vary from gage to gage. Improvements include removal of debris, sediment and vegetation accumulation downstream of gages; adjustments of measuring staffs; replacement or modification of communication pipes; potential retrofit of some gages to improve flow measurement capability; abandonment and relocation of some gages to enhance efficiency, etc.

Of the 39 active precipitation gages evaluated, 24 indicated having problems. These gages were evaluated based on their adequacy and reliability to measure precipitation data during storm events. Improvements to the function of precipitation gages include substantial trimming of trees to ensure adequate clear areas for collection of precipitation data; relocation of gages for cases where substantial tree trimming may not be environmentally possible; and annual trimming of weeds for access and fire safety.

This condition report reveals that a number of existing hydrological gages may not be providing the qualitative flow or precipitation data due to existing impacts to or inadequacies of these gages. Staff will engage you for recommendations in addressing some of the problems, as well as, providing follow-up reports in the near future.

Sincerely,

James C. Wang

James C. Wang
Engineering Unit Manager
Coyote and Pajaro Watersheds Division

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Stream Gage Sta. 58 –Coyote Creek at Edenvale

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TABLE OF CONTENTS

Page

PREFACE……iv

EXECUTIVE SUMMARY

Project Goal……2
Project Objectives……2
Project Allocation Formula and Basis……3
Linkage to Board Policy……3

TASK A – EVALUATE EXISTING GAGE SYSTEM……4

MAPS

Figure 2-a ***Guadalupe Watershed***……9
Figure 2-b ***West Valley/Lower Peninsula Watershed***……10
Figure 2-c ***Coyote Watershed***……11
Figure 2-d ***Uvas Watershed***……12

TABLES – EXISTING ISSUES AND POTENTIAL REMEDIES *(with prioritization)*

Table 1. ***Districtwide Stream Gages***……13
Table 2. ***Districtwide PrecipitationGages***……14

PHOTOS

Stream Gages/Stages……15
Precipitation Gages……43

PREFACE

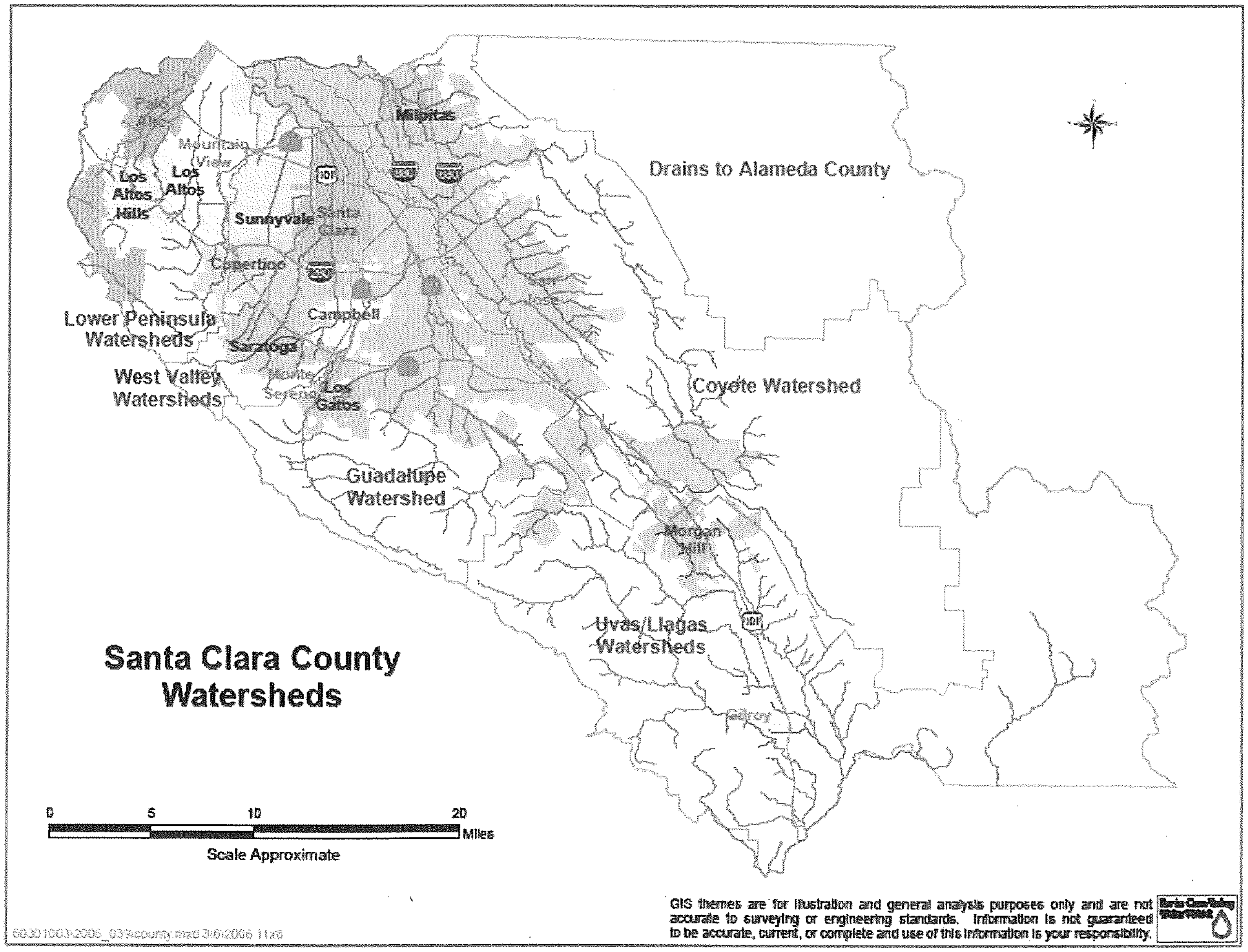
This preliminary report is the first phase component of the main Stream Gage Study Operational Program (Study), Task A. The main phases for completing the Study include the following items:

Task A	Evaluate Existing Gage System
Task B	Identify New Gage Stations
Task C	Identify Required Modifications to Existing Gages in Coyote and Uvas-Llagas Watersheds
Task D	Develop Gage Augmentation Plan
Task E	Validate Coyote and Uvas-Llagas Hydrology
Task F	Develop Action Plan to Strengthen District Watershed Functions

The main target audience for this report consists mostly of internal staff that oversees and operates the stream and precipitation gages, as well as, the management of hydrological data from these gages. Although the Study initially benefits the Coyote and Uvas-Llagas Watersheds, all watersheds within the jurisdictional area of the water district will eventually be considered. See Figure 1 for a view of all the watersheds. Incidental target audiences, who would have a need to understand the operations and data capability of the gages, would include many internal customers such as Operations, Water Supply, Capital, Watershed, Flood Control, etc. and external customers such as the U.S. Army Corps of Engineers, and other local entities that have direct economic linkages with the hydrological data and operations of the gages.

Reference is made to the ***2009 Fiscal Year Annual Report on Services Provided by the Hydrologic Data Measurement and Management Program***, which was prepared in 2009 by the Water Supply Operations Planning and Analysis Unit. That annual report provided a basic evaluation of the gage system network from both low and high-flow perpectives by Hydrographer staff that identified several operational issues. This Study will provide a more detailed perspective of the overall evaluation of the gages from low and high-flow perspectives, a prioritized corrective maintenance schedule and customer input for additions/deletions to the network by both Hydrographer and Engineering staff .

FIGURE 1 – Santa Clara Valley Watersheds



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EXECUTIVE SUMMARY

The focus of the Study is to examine the existing distribution of precipitation and streamflow gages within the jurisdictional area of the water district. The main objective is to determine if the gages meet the needs of the District to achieve our missions of adequate water supply, flood protection and stream stewardship; and if they are not sufficient to meet the needs, develop a gage augmentation plan.

Project Goal

The project goal is to ensure adequacy of precipitation and streamflow gages and data to achieve the District missions of water supply, flood protection and stream stewardship.

Project Objectives

The results of this study have direct impact on the work to be performed by the FAHCE project, Raw Water - Field Operations and Pipeline Maintenance Unit, the Water Supply Operations Planning and Analysis Unit, and many of the units in Watersheds. Hence, throughout the study, coordination with these units is of utmost importance.

1) Evaluate the existing precipitation and streamflow gage distribution and determine its adequacy by 6/30/10.

2) Identify new gage stations and staffing requirements required to meet District needs and develop a cost and schedule plan for new gage construction by 8/31/10.

3) Identify modifications needed, if any, to existing gages in Coyote and Uvas/Llagas Watersheds, by performing hydraulic analysis, as needed, to examine accuracy of rating curves, and determine special maintenance needs, if applicable, by 10/31/10.

4) Develop gage or rating curve modification (via hydraulic modeling) with high flow gaging calibration results to properly interpret high flow gage data in Coyote and Uvas/Llagas Watersheds by 2/28/11.

5) Review and analyze, and modify if necessary, streamflow gage setup, rating and data of West and Guadalupe Watersheds by 6/30/11.

6) Analyze selected qualified historical precipitation and streamflow records statistically in the Coyote and Uvas/Llagas Watersheds to compare with District's rainfall-runoff model results for possible reconciliation of Design Flow calculations by 9/30/11.

7) Develop a long term action plan to develop a database for hydrologic and hydraulic information of the Watersheds by 6/30/12.

Project Allocation Formula and Basis

Fund 12 (Watershed and Stream Stewardship Fund) – 100%

This project supports the flood protection element of the Clean, Safe Creeks Program and the watershed stewardship mission of the District.

Linkage to Board Policy

This project is linked to the Board Ends Policy 2.2 – There is reduced potential for flood damages.

It is also linked to Policy 2.2.1.3 – Physical stream functions and processes are integrated.

TASK A – EVALUATE EXISTING GAGE SYSTEM

The primary focus for this task was to evaluate specific and critical streamflow gages within all four main watersheds—Coyote, Uvas/Llagas, Guadalupe and West. Figures 2-a to 2-d detail the watersheds with the stream gage locations, along with other information.

- Hydrographers and engineers visited all streamflow and precipitation gage locations within each watershed.
- During each field visit, design and maintenance issues at high/low flows were discussed in the field.
- Potential remedies to solve streamflow and precipitation gage concerns were also evaluated.

Table 1 details any potential issues and potential remedies for all active streamflow gages. Table 2 details and potential issues and potential remedies for all active precipitation gages.

Not all of the concerns for the identified specific streamflow gage stations will be addressed during Fiscal Year 2011. Therefore, the Study team made an initial decision to prioritize which of the stream and precipitation gages would be repaired, relocated, abandoned or improved. The priority list is preliminary and can be adjusted based on the following parameters:

- Funding availability—e.g., if a specific stream gage would provide a combined benefit from both watershed and water utility needs, in a way that funding sources for addressing the stream gage comes from both sources, there would be mutual opportunity to remedy that stream gage.
- Combining high and low flow functions for the streamflow gages—i.e., if there is already a properly functioning low or high flow gage, respectively incorporating a high or low flow gage within the framework of the existing streamflow gage may be less costly. However, as warranted, specific streamflow gages may be identified as "operated low flow only" or "operated high flow only" streamflow gages.
- Minor repairs—a solution for a precipitation or stream gage requires a minor fix, such as a regular SMP period for timely minor sediment removal and/or vegetation removal. The cost for this minor fix may be minor.
- Major repairs, but precipitation or stream gage is critical—this is a case when there is a major repair required for a precipitation or stream gage and the operation of the specific gage is critical. The cost would not be the main factor, but the necessity for repairing the facility is elevated to a higher priority.

Summary of Conditions for Streamflow Gages

Approximately 78 active streamflow gages were evaluated. Refer to Table 1. All streamflow gages were evaluated based on their ability to provide adequate hydrological streamflow data. A few of the gages will require either relocation to another site, abandonment or creation of new gages. The following is a list of these gages.

- 5003, Upper Penitencia at Noble – *Repair diversion or abandon*
- 5007, Coyote Creek at Coyote – *Relocate*
- 5010, Fisher Creek at Monterey Road – *Maintain gage, and potentially create a new one*
- 5055, Kirk Ditch at Curtner Avenue - *Relocate*
- 5065, Little Arthur Creek at Redwood Retreat – *Potentially abandon*
- 5078, Bodfish Creek at Whitehurst Road – *Potentially abandon*

There are about 27 gages requiring a one-time modification.

- 5012, Coyote Creek below Coyote Reservoir – *Need cableway and replace crest plate*
- 5013, Calero Creek below Coyote Reservoir – *Remove tree obstruction*
- 5015, Almaden-Calero Canal at Almaden Reservoir – *Resolve intake and replace staff*
- 5021, Ross Creek at Blossom Hill Road – *Install high flow gage bridge*
- 5023, Guadalupe River above Almaden Expressway (USGS) – *Remove algae on weir*
- 5024, San Tomas Creek at Williams Road – *Fix communication pipe and highlight staffs*
- 5025, Saratoga Creek at Pruneridge Avenue – *Install new staffs and bubbler*
- 5026, Calabazas Creek at Wilcox School – *Review sloped staff or add new vertical staff*
- 5031, Calabazas Creek at Rainbow Avenue – *Adjust orifice height*
- 5032, Permanente Creek at Berry Avenue – *Review sloped staff or add new vertical staff*
- 5033, Hale Creek near Magdalena Avenue – *Clear solar panel of obstructions*
- 5035, Stevens Creek upstream of Highway 85 – *Extend bubbler for better gage readings*
- 5043, Guadalupe Creek at Hicks Road – *Need cableway*
- 5044, Stevens Creek below Stevens Creek Reservoir – *Replace gage with bubbler system*
- 5046, Los Capitancillos Recharge System – *Replace Parshall flume if warranted*
- 5058, Coyote Creek at Edenvale – *Remove heavy vegetation downstream of weir*
- 5070, Alamitos Creek at Greystone Lane – *Remove downstream tree and raise weir*
- 5073, Canoas Creek at Almaden Expressway – *Move gage station upstream*
- 5074, Sunnyvale East Channel at Hwy 101 – *Remove dragon tooth, relocate high flow bridge, install staff(s) and bubbler system.*
- 5080, Llagas Creek above Chesbro Reservoir – *Fix worn out areas of gage*
- 5083, Upper Penitencia Creek at Dorel Drive – *Relocate or fix weir*

- 5084, Uvas Creek below Uvas Reservoir – *Team needs to further evaluate gage, if another gage is necessary.*
- 5086, Uvas Creek above West Luchessa Avenue – *Team needs to evaluate if this stage gage requires conversion to a high flow gage and if another gage is necessary.*
- 5088, Guadalupe River at Alamitos Fish Ladder – *Retain gage, but construct a new one downstream of Blossom Hill Road*
- 5093, Guadalupe Creek above Branham Lane – *This stage gage may be converted to the new stream gage referred to the improvements from stream flow gage 5088.*
- 5095, Los Gatos Creek at Bascom Avenue – *Remove/trim vegetation and monitor*

Lastly, the following gages would require annual clearing of vegetation and sediment and/or monitoring of vegetation growth and sediment deposition prior to required removal. Some of these gages are duplicated from the list indicating a one-time modification. The duplicate gages are shown in bold.

- 5001, Upper Penitencia Creek at Piedmont Road
- **5012, Coyote Creek below Coyote Reservoir**
- **5021, Ross Creek at Blossom Hill Road**
- **5032, Permanente Creek at Berry Avenue**
- 5050, Los Gatos Creek at Lincoln Avenue
- **5058, Coyote Creek at Edenvale**
- 5059, Los Gatos Creek at Lark Avenue
- 5082, Coyote Creek at Madrone (Boys' Ranch)
- **5083, Upper Penitencia Creek at Dorel Drive**
- 5085, Llagas Creek at Southside Drive (USGS)
- 5087, Upper Penitencia Creek at Mabury Diversion
- **5095, Los Gatos Creek upstream of Bascom Avenue**
- 5103, El Camino Storm Drain at Willow Avenue
- 5108, Guadalupe River at Montague Expressway
- 5110, Guadalupe River at Trimble Road

Based on the recent evaluation, approximately 41 streamflow gages will require improvement based on abandonment, relocation, creation of a new gage, a one-time modification or annual sediment and/or vegetation removal or monitoring.

Summary of Conditions for Precipitation Gages

Approximately 39 active precipitation gages were evaluated. Refer to Table 2. All precipitation gages were evaluated based on their ability to provide adequate hydrological precipitation data. Some of the gages may require relocation, a one-time modification and or extensive tree trimming, if feasible.

- 6001, Alamitos – Trim trees
- 6017, Coe Park – Relocate
- 6024, Dahl Ranch – Relocate
- 6037, Laguna Seca – Relocate and also address access rights
- 6048, Sunnyvale Hamilton Water Treatment Plant – Relocate
- 6053, Maryknoll – Relocate
- 6079, Rinconada Water Treatment Plant – Relocate trees, if feasible
- 6129, Palo Alto – One-time modification of gage housing
- 6132, Evergreen – Relocate or trim tree, if feasible
- 6136, Morgan Hill – Relocate or trim trees, if feasible

Many of the gages will require annual trimming of weeds for access and fire safety, as well as, monitoring of their function. The following is a list of these gages.

- 6004, Almaden Watershed
- 6008, Biel Ranch
- 6015, Castro Valley
- 6018, Coit Ranch
- 6021, Coyote Reservoir
- 6023, Curtner Ranch
- 6034, Haskins Ranch
- 6041, Leroy Anderson Dam
- 6067, Mt. Hamilton
- 6069, Mt. Umunhum
- 6098, Shanti Ashrama
- 6121, Mountain View Corporation Yard
- 6123, Guadalupe Watershed
- 6138, Banjo Point

Based on the recent evaluation, approximately 24 precipitation gages will require improvement based on annual trimming of weeds for access and fire safety, relocation, a one-time modification, or extensive tree trimming, if feasible.

CEQA Consideration

Implementation of necessary modifications or relocations of existing gages, as well as, development and siting of new gages will require environmental assessments through the CEQA process. CEQA considerations for immediate or critical proposals will be handled separately for each case. However, for other non-immediate concerns, a limited-term programmatic CEQA process will be developed for improvement of existing and future gages.

- Minor maintenance of streamflow gages, such as annual sediment and vegetation removal, will be covered under the Stream Maintenance Program (SMP).

- Minor maintenance of a precipitation gage, such as vegetation trimming and road clearing, would require application for a Categorical Exemption (CE).

- Relocation or new construction of a streamflow and precipitation gage would require application for an individual permit.

The following inserts are part of this report, but electronically are in separate format.

Page

MAPS

Figure 2-a *Guadalupe Watershed*.. 9
Figure 2-b *Lower Peninsula/West Valley Watershed*.. 10
Figure 2-c *Coyote Watershed*.. 11
Figure 2-d *Uvas Watershed*.. 12

TABLES – EXISTING ISSUES AND POTENTIAL REMEDIES *(by station/priority)*

Table 1. *Districtwide Stream Gages*... 13
Table 2. *Districtwide PrecipitationGages*.. 14

Figure 2-a

Water Resources Management Facilities Guadalupe Watershed

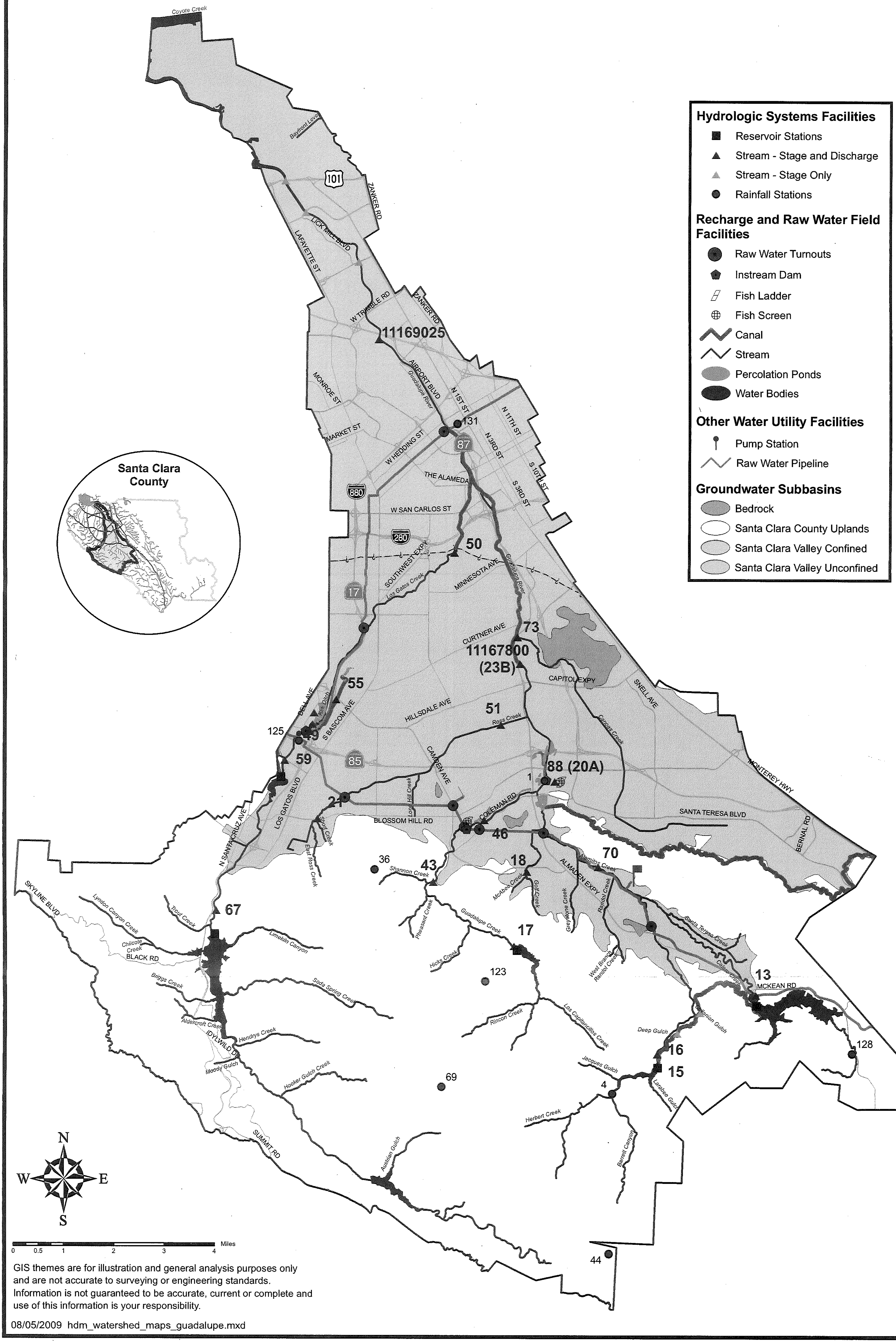

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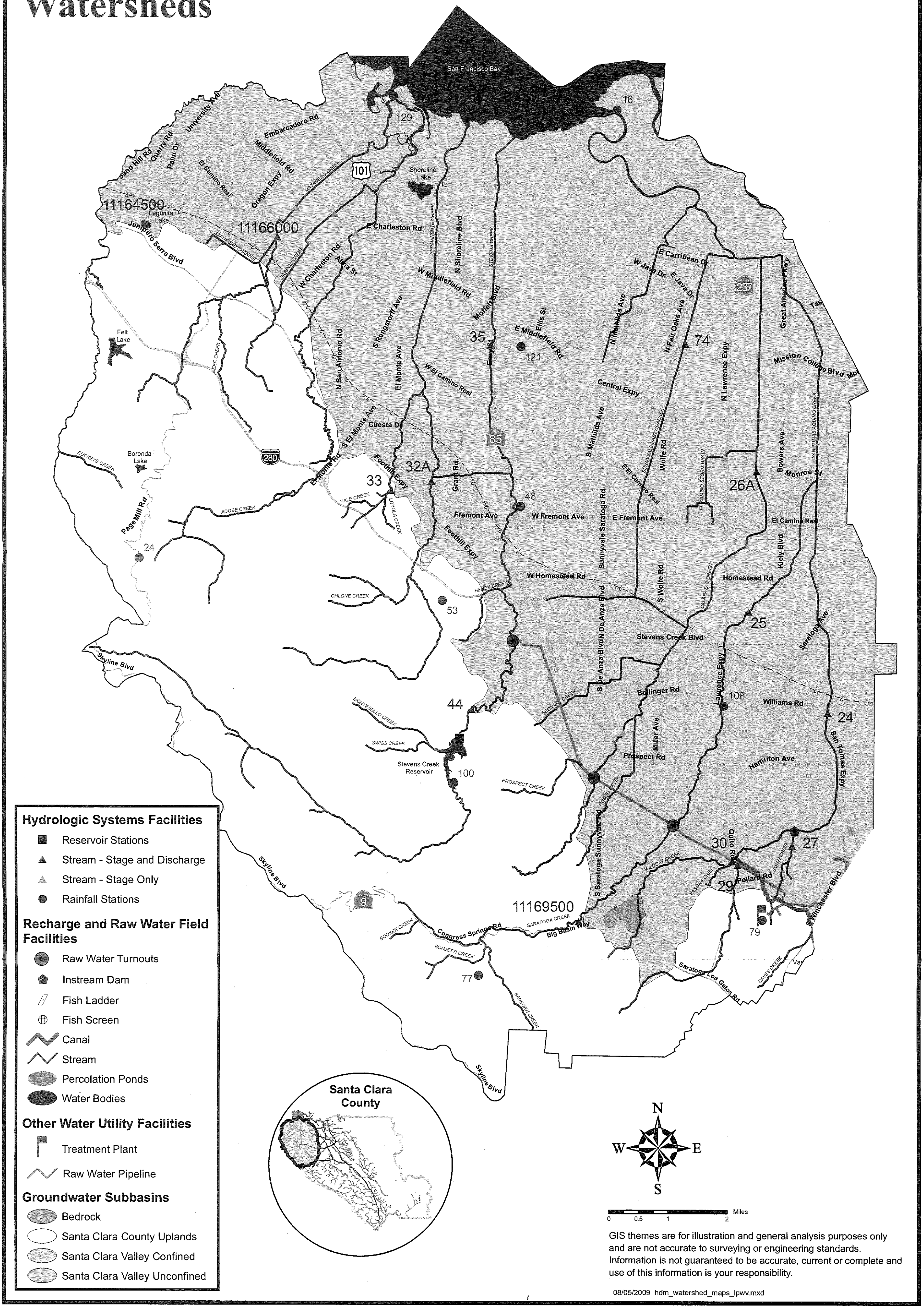
Figure 2-b

Water Resources Management Facilities Lower Peninsula and West Valley Watersheds



Hydrologic Systems Facilities

- ■ Reservoir Stations
- ▲ Stream - Stage and Discharge
- ▲ Stream - Stage Only
- ● Rainfall Stations

Recharge and Raw Water Field Facilities

- Raw Water Turnouts
- Instream Dam
- Fish Ladder
- Fish Screen
- Canal
- Stream
- Percolation Ponds
- Water Bodies

Other Water Utility Facilities

- Treatment Plant
- Raw Water Pipeline

Groundwater Subbasins

- Bedrock
- Santa Clara County Uplands
- Santa Clara Valley Confined
- Santa Clara Valley Unconfined

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Figure 2-c

Water Resources Management Facilities
Coyote Watershed

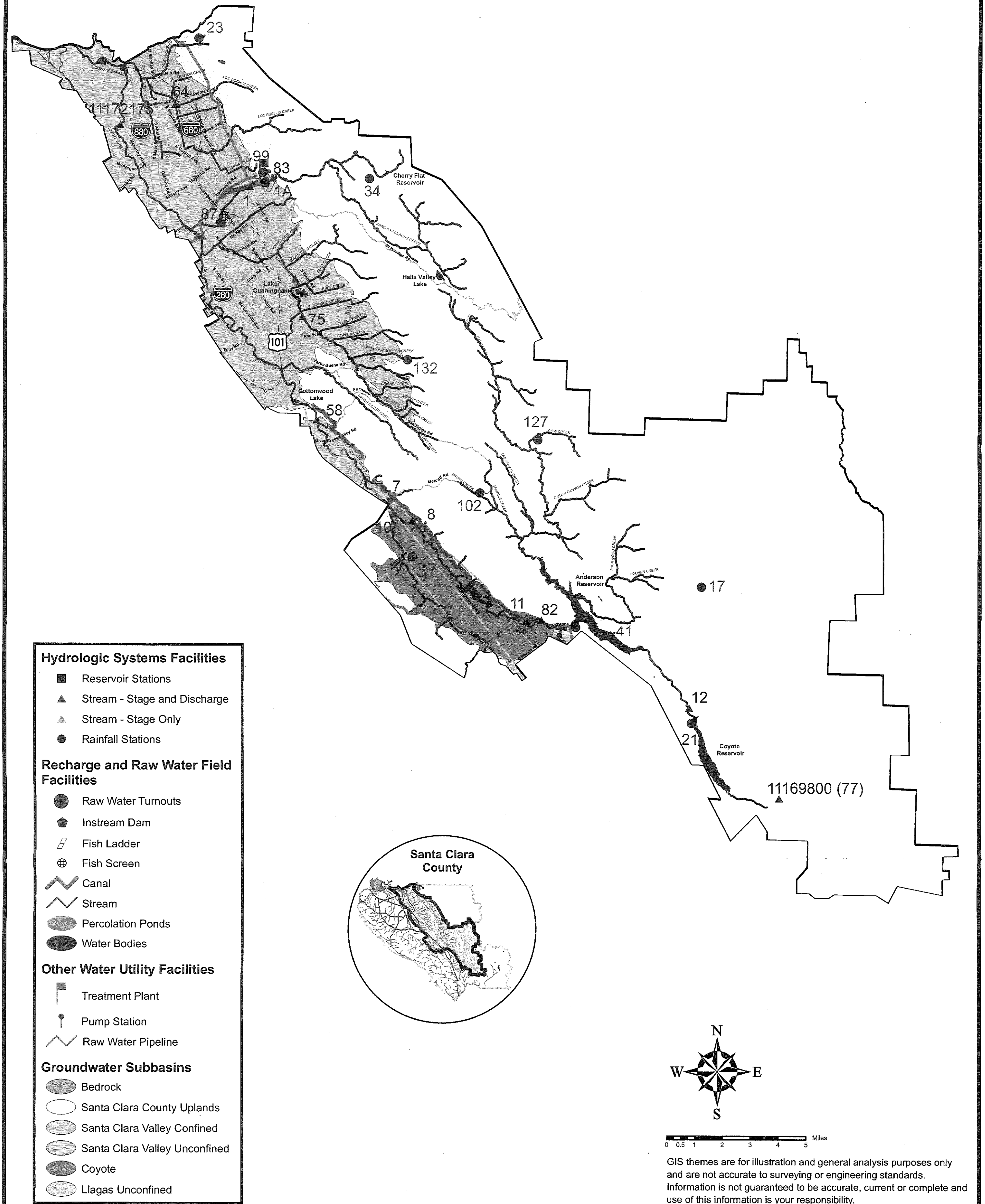

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Figure 2-d

Water Resources Management Facilities Uvas/Llagas Watersheds

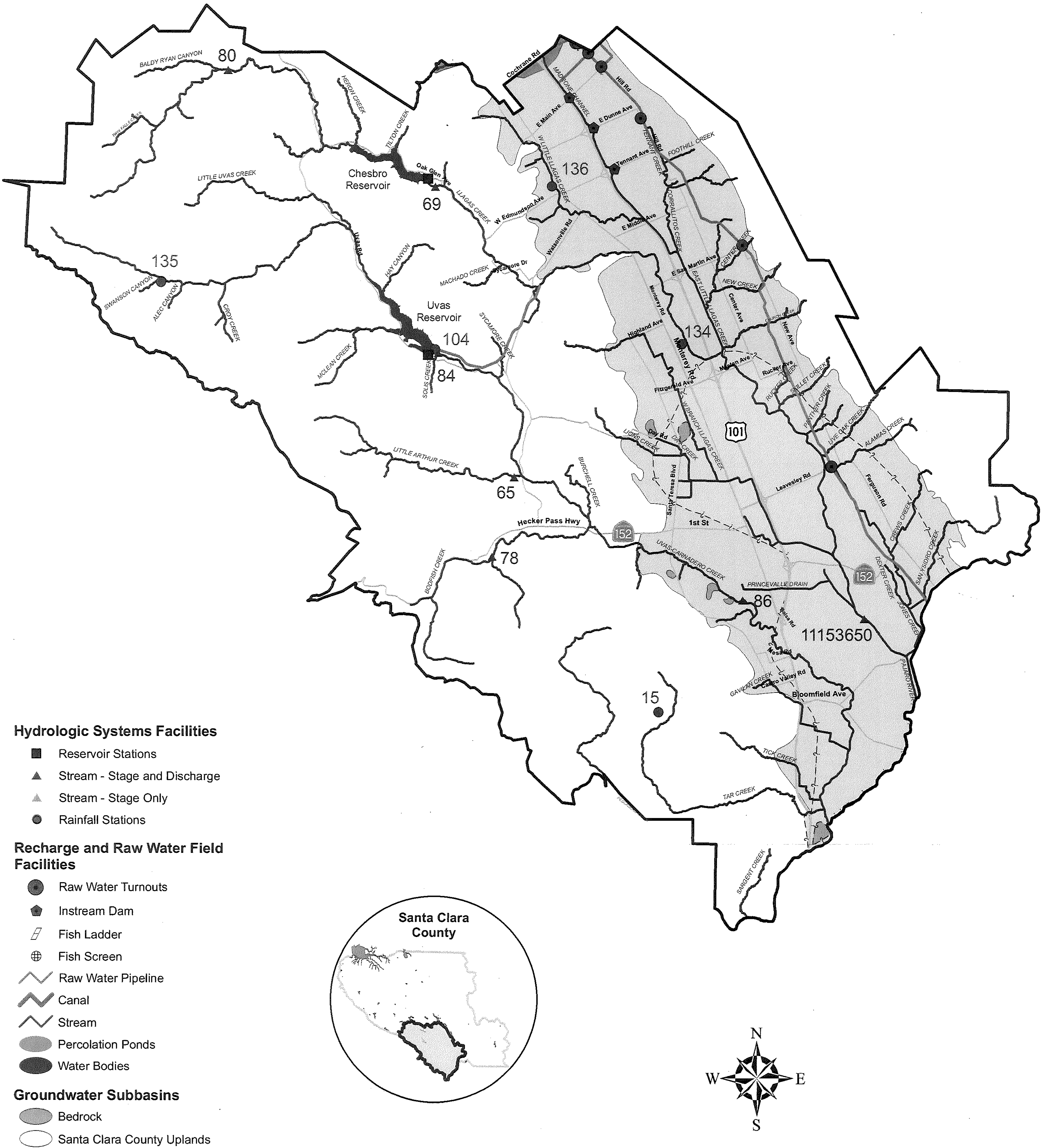

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Table 1. Existing Santa Clara Valley Water District Stream Gages (sorted by station)

Sta. No.	Alert ID	Priority	Station Name	Station Type	Instrument Type	Watershed	Quality of Stream Gage Records	Rating Curve defined for low flows?	Rating Curve defined for med flows?	Rating Curve defined for high flows?	Design and Maintenance Issues	Potential Remedies
5001	1489	16	Upper Penitencia Ck at Piedmont Rd	Gage	Bubbler	Coyote	Fair	Yes	Yes	Yes, only up to 250 cfs	Minor storms fill upstream and downstream of weir section with sediments, potentially causing inconsistent measurements.	Remedy 1/1: Schedule annual sediment removal towards the end of the SMP period. For sediment build-up that occurs during non-SMP periods, apply for regulatory permitting to allow removal of sediments in cases when there are no fish present. Consult with a Water District fishery biologist before sediment removal during non-SMP periods. Area is not a rearing habitat, but a fish passage corridor.
5003			Upper Penitencia Recharge System at Noble Avenue	Gage	Stilling Well Basin	Coyote	Poor	Few measurements	N/A	N/A	Gage is not in service, and flows are estimated by W. R. Tech's. Stilling well now measures U. Pen. Ck. flows, not diversion flows. Operations is not able to divert full range of flows. Since the diversion channel is no longer in use, excessive vegetation growth completely blocks the diversion channel upstream.	Remedy 1/1: Diversion requires modification. Operations did not want to fund a repair in prior years.
5007		3	Coyote Ck at Coyote	Gage	Stilling Well Basin	Coyote	Poor, lack of stable control but flow gaged monthly	Questionable	Questionable	N/A, gage not designed for high flows.	Currently, this gage only provides low-flow measurements based on estimated natural conditions, since there is no weir downstream of the gage. Due to shifting channel conditions, flow readings are not consistent. This station provides key readings for groundwater balance measurements. Incorporating high-flow measurements is not possible.	Remedy 1/1: Relocate the existing stream gage to a location that would provide consistent and adequate low and high flow gaging measurements. The location must be such that it does not compromise groundwater balance measurements.
5008			Coyote Canal above Metcalf Chute	Gage	Stilling Well Basin	Coyote	N/A	N/A	N/A	N/A	Inactive	None required.
5010		25	Fisher Ck at Monterey Rd	Gage	Stilling Well Basin	Coyote	Good, but flows can be affected by backwater when Coyote Creek is bank full.	Yes	Yes	No high flow measuring section, possible backwater effects	Stream gage works mostly for low to medium flows.	Stream gaging measurements is not an issue. The issue with this site is whether or not the source of the flows being measured is coming from overland flows or from the upwelling from the groundwater, or from a combination of both flow sources. *Ken to validate if high flows can be measured from Santa Teresa Boulevard, but that site is quite a distance from this gage station.* Have a hydraulic engineer review/validate double culvert computations. If another station needs to be added to verify low flows for this station, then water supply or groundwater unit should pay for the new station installation.
5011			Coyote Canal at diversion dam	Gage	Stilling Well Basin	Coyote	N/A	N/A	N/A	N/A	Inactive	None required.
5012		27	Coyote Creek below Coyote Reservoir	Gage	Stilling Well Basin	Coyote	Fair, because of undefined rating	Yes	Yes, up to 200 cfs	Yes, from theoretical spillway computations	Weir crest plate is rusted through, and concrete is eroding. Weeds on access road could be fire/safety hazard. There may be issues with access safety through the concrete bridge, which is owned by a private owner. There is no way to service gage during high flows, since the crossing would have overflows. Not able to verify theoritical rating w/o cableway. Spillway flow verification is not possible, unless measurements of changes to storage from Anderson are accurate.	Remedy 1/1: Need cableway; replace crest plate; perform annual veg removal to clear access road; replace concrete bridge if required.

Table 1. Existing Santa Clara Valley Water District Stream Gages (sorted by station)

Sta. No.	Alert ID	Priority	Station Name	Station Type	Instrument Type	Watershed	Quality of Stream Gage Records	Rating Curve defined for low flows?	Rating Curve defined for med flows?	Rating Curve defined for high flows?	Design and Maintenance Issues	Potential Remedies
5013	1546	17	Calero Creek below Coyote Reservoir	Gage	Stilling Well Basin	Guadalupe	Good	Yes, subject to vegetation growth/algae and fill	No	No real high flows experienced	Existing large tree in channel about 100 to 150 feet downstream is causing some back water.	Remedy 1/1: Remove tree. *Currently, this is being addressed now, within this year's SMP period.*
5014	1541		Almaden-Calero Canal at Calero Reservoir	Gage	Stilling Well Basin	Guadalupe	N/A	N/A	N/A	N/A	Inactive	None required.
5015			Almaden-Calero Canal at Almaden Reservoir	Gage	Stilling Well Basin	Guadalupe	Fair due to constant leakage from Almaden-Calero Canal that is less than 1 cfs.	N/A, Canal not operated at low flows	Yes	Not required	Some intake issues. Staff needs to be replaced.	Remedy 1/1: Resolve intake issues and replace staff.
5016	1544		Alamitos Creek below Almaden Reservoir	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	Yes, from theoretical spillway computations	No issues	None required.
5017	1542		Guadalupe Creek below Guadalupe Reservoir	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	Yes, from theoretical spillway computations	No issues	None required.
5018			Golf Creek above McAbee Road	Gage	Stilling Well Basin	Guadalupe	Fair with estimates being poor	Yes	Yes	No	No issues. Monitor algae growth. Operations is requesting for real time telemetry to be installed for this station.	None required.
5021			Ross Creek at Blossom Hill Road	Gage		Guadalupe	Good	Yes, but with shifts due to wear on weir, algae and debris buildup	No	No	No high flow gaging capability.	Remedy 1/1: Install a high-flow gaging access bridge immediately downstream of Blossom Hill Road Bridge. Have an annual schedule for trimming the trees downstream of the gage.
5023	1535		Guadalupe River above Almaden Expressway	USGS (stage)	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Algae growth on weir and some vegetation adjacent above weir	Remedy 1/1: Remove algae on weir and remove/trim some of the vegetation.
5024	2050	9	San Tomas Creek above Williams Road	Gage	Stilling Well Basin	West Valley	Fair, since low flows are difficult to measure due to the wide, concrete channel with slow velocities and high flows due to very rapid velocities.	Yes	Yes	Yes, up to 1,000 cfs	Lower communication pipe plugs up and is bent downstream. Stream dry most of the season. The existing staff gage without color is hard to read.	Remedy 1/1: Fix communication pipe. This repair was completed by the Welding group; no reliable material to weld to so a compression fitting was installed. Paint color on the staff gage scale. *Hydrographers plan to add bubbler this year.*

Table 1. Existing Santa Clara Valley Water District Stream Gages (sorted by station)

Sta. No.	Alert ID	Priority	Station Name	Station Type	Instrument Type	Watershed	Quality of Stream Gage Records	Rating Curve defined for low flows?	Rating Curve defined for med flows?	Rating Curve defined for high flows?	Design and Maintenance Issues	Potential Remedies
5025		12	Saratoga Creek at Pruneridge Avenue	Gage	Stilling Well Basin	West Valley	Poor, lack of measurements, float sitting on mud, missing records.	Yes	Yes	No	The communication pipes are buried and the staffs are destroyed. Currently, data from this gage is not being used by any low-flow customers. However, this site is important for high-flow measurements. Staffs are needed.	Remedy 1/1: Install new staffs and bubbler system at site for High Flow data only.
5026	1477	11	Calabazas Creek at Wilcox School	Gage	Stilling Well Basin	West Valley	Poor, staff and gage height relationship hard to establish due to sloped staff.	Yes	Yes, but needs more current meter measurement	No, high flow velocities impact current meter measurements	There are fast 15 fps velocities during high flows, causing waves at the weir. Existing pipes too close to weir, experiencing drawdown effect. A 75-lb weight is not good enough for measuring high flow measurements and many debris. There may be a difference of approximately 1.5 feet when comparing actual data with the HEC-RAS model.	Remedy 1/1: Engineers to review sloped staff and provide conversion table or install vertical staffs. Engineers to review the existing HEC-RAS model, to see if adjustment factor(s) can be provided to hydrographers when they are performing high flow measurements--> One idea: Tapedown from bridge to get average depth, compare w/ model results, measure surface velocities with adjustments, and use a calculation for flow.
5027			Smith Creek above Elam Ave	Gage	Stilling Well Basin	West Valley	Fair	No	No	No	Major algae growth in summer, low flow most of time.	None required.
5029			San Tomas Creek at UPRR near Quito Rd	Gage	Stilling Well Basin	West Valley	Fair	Yes	No	No	Flashy stream. Dry all summer.	None required.
5030			Wildcat Creek at UPRR near Quito Rd	Gage	Stilling Well Basin	West Valley	Poor	Yes, but needs to be redrawn.	No	No	No issues	None required.
5031	1540		Calabazas Creek at Rainbow Ave	Stage	Bubbler	West Valley	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No control at low flow--orifice is above low flows.	Remedy 1/1: Adjust orifice height.
5032		22	Permanente Creek at Berry Avenue	Gage		Lower Peninsula	Poor	Yes	Yes	No	The area has sedimentation issues, although sediments were removed last year. Sloped staffs require conversion.	Remedy 1/1: Engineers to review sloped staff and provide conversion table or install vertical staffs. Continue to remove sediments, in parallel with incorporating a bubbler-type system or raising the existing communication pipe.
5033	1456		Hale Creek near Magdalena Ave	Gage	Stilling Well Basin	Lower Peninsula	Fair	Yes	Yes	No	Existing tree can block solar power panel.	Remedy 1/1: Trim existing tree to prevent solar power panel blockage.

Table 1. Existing Santa Clara Valley Water District Stream Gages (sorted by station)

Sta. No.	Alert ID	Priority	Station Name	Station Type	Instrument Type	Watershed	Quality of Stream Gage Records	Rating Curve defined for low flows?	Rating Curve defined for med flows?	Rating Curve defined for high flows?	Design and Maintenance Issues	Potential Remedies
5035		7	Stevens Creek U/S Hwy 85 (by Central Avenue)	Gage		Lower Peninsula	Fair	Yes	Yes	Yes	Sediment buries orifice. There is no consistent weir pool, and the weir is at an angle. Limited access rights. Point of Zero Flow (PZF) fluctuates.	Remedy 1/2 (short term): Extend existing pipe further into middle of channel, to obtain more effective readings, for now. Remedy 2/2 (long term): Relocate gage upstream of Fremont Avenue fish ladder, especially for Operational/FAHCE requirements, or extend bubbler further out. *Need further consultation with team for clarification on further required improvements at this station.*
5043		8	Guadalupe Creek at Hicks Road	Gage	Stilling Well Basin	Guadalupe	Fair	Yes, but need new rating due to facility improvements	No	No	No cableway or nearby bridge for high flow measurements.	Remedy 1/2: Construct a cableway upstream of the gage for measuring high flows. Potentially transfer to USGS for cableway installation and high flow monitoring expertise. FAHCE may need different location at Camden? Remedy 2/2: Measure high flows from upstream of Camden Avenue Bridge *(Ken to validate this alternative. May need Veg. work)*
5044	1482		Stevens Creek below Stevens Creek Reservoir	Gage	Stilling Well Basin	Lower Peninsula	Fair	Yes	No	Yes, from theoretical spillway computations from Stevens Creek Dam	Occasional Stilling well plugging.	Remedy 1/1: Monitor and replace w/ Bubbler if necessary.
5046			Los Capitancillos Recharge System	Gage	Stilling Well Basin	Guadalupe	Fair	No	No	Not required	Parshall flume may be deteriorating, leading to long term weir installation location if fails.	Remedy 1/1: Monitor and replace as necessary.
5047			Kirk Ditch at head	Gage	Stilling Well Basin	Guadalupe	Fair	No	No	Not required	No issues	None required.
5049			Upper Page Ditch at Dell Ave	Gage	Bubbler	Guadalupe	Good	Yes	Yes	N/A	No issues	None required.
5050	1494		Los Gatos Creek at Lincoln Ave	Gage	Stilling Well Basin	Guadalupe	Poor above 200 cfs	Yes, but gravel fill may cause some shifting	No	No	Some vegetation growth upstream of weir causes negative shift to the rating. Weir has a leak on the right end.	Remedy 1/1: Trim vegetation upstream of weir.
5051	2058		Ross Creek at Cherry Ave	Gage	Stilling Well Basin	Guadalupe	Fair, stage at higher flows is erratic due to flashy flows.	No	No	No	Backwater from Guadalupe River possible. Very flashy system.	None required.
5053			Upper Page Ditch at head	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	Yes	No issues	None required.

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5055			Kirk Ditch at Curtner Ave	Gage	Stilling Well Basin	Guadalupe	Fair	No	N/A	N/A	Difficult access point and entrance	Current capital project to relocate on SCVWD property.
5058	2062	1	Coyote Ck at Edenvale	Gage	Bubbler	Coyote	Poor, due to clogged intakes and debris-strewn, sedimented control conditions.	Yes	No, need definition between 4 to 6 feet of stage	Yes	Weir location is not located in a stable area of the channel. Several years of heavy vegetation and sediment build-up have undermined the reliability of the weir to provide consistent flow measurements. Central portions of the weir are completely submerged with sediments. Excessive vegetation growth downstream has choked channel conveyance, reducing flow velocities and allowing substantial amount of sediments to fill channel downstream of the weir.	Remedy 1/2: Based on recent discussions with the Coyote and Pajaro Program Support Unit, the first remedial phase for functional improvement of this weir is to maintain the existing weir and remove the heavy vegetation and sediments downstream of the existing weir within the 2010 SMP period. Preliminary Regulatory and County approval would be required prior to June 15. Remedy 2/2: Once the proposed maintenance is completed in summer 2010, the plan is to monitor the success of the work (see how well the gage works). If significant improvement isn't realized within 2 years, then a plan to relocate the gage station to another more suitable location will be implemented.
5059	1492		Los Gatos Creek at Lark Ave	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	No	Heavy cattail formation on upper westerly side of weir	Remedy 1/1: Remove cattails upstream of weir.
5064	1545	18	Berryessa Ck above Calaveras Blvd	Gage	Bubbler	Coyote	Poor, due to effects of painting, aquatic plant growth and undefined rating.	Yes	No	No	This stream gage currently works properly. Low flow measurements will be discontinued at this gage. However, high flow measurements would be required, since this is the only stream gage for Berryessa Creek. According to 2009 Field Assessment, there is poor, lack of measurement range and orifice burial.	There needs to be coordination when high flow measurements will be made at this location. Have engineers decide what stages define low, medium and high flows.
5065		13	Little Arthur Ck at Redwood Retreat Rd	Gage	Stilling Well Basin	Uvas/Llagas	Poor, due to unstable control issues.	No	No	No	The measuring pipes are buried by sand after sediment removal after 2002. This station primarily measures low-flows; high flow measurements are not required. Currently, for low-flows, data is not really utilized. This station is outside the limits of the recharge zone.	Based on Ken's recommendations, abandon the station and salvage the usable components, if a low flow gage downstream of Santa Teresa Boulevard at Uvas Creek is constructed.
5067	1490	21	Los Gatos Creek below Lexington Reservoir	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	Yes, from theoretical spillway computations	Data questionable at high flows. Steep gradients. Measures Trout Creek flows and other miscellaneous drainage flows. Actual measurements from spillway are questionable.	Remedy 1/1: Slow down flow, gage pool, move gage. This is very low priority for high flow measurement, since this is just downstream of the reservoir.
5069			Llagas Creek below Chesbro Reservoir	Gage	Stilling Well Basin	Uvas/Llagas	Good	Yes	Yes	Yes, from theoretical spillway computations	No issues	None required.
5070		19	Alamitos Creek at Greystone Lane	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	No	Downstream of the weir, it gets sedimented. An existing tree immediately downstream is also adding to the effect. Low-flow measurements is a concern. High-flow measurements are not a concern.	Remedy 1/1: Move the existing tree downstream to another location; raise weir to gain some slope downstream. SMP period max'd for removing/relocating trees in 2009.

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Sta. No.	Alert ID	Priority	Station Name	Station Type	Instrument Type	Watershed	Quality of Stream Gage Records	Rating Curve defined for low flows?	Rating Curve defined for med flows?	Rating Curve defined for high flows?	Design and Maintenance Issues	Potential Remedies
5072	1501		Upper Penitencia Creek diversion to Mabury Recharge Pond	Gage	Bubbler	Coyote	Fair, due to possibility of backwater effects from keeping the pond level too high.	Yes	N/A	N/A	No issues	None required.
5073	1485	20	Canoas Creek at Almaden Expressway	Gage	Stilling Well Basin	Guadalupe	Good, except for periods of backwater and summer periods when algae can backup upstream of the control, causing poor readings.	Yes	Yes	No, since high flows can be affected by backwater effects from Guadalupe River	Backwater from Guadalupe River during high flows affects high flow measurements. The pipes are also too close to the weir. Pipes corroding?	Remedy 1/1: Move station upstream to reduce or eliminate backwater effect from Guadalupe River.
5074		14	Sunnyvale East Channel U/S Hwy 101	Gage	Bubbler	West Valley	Fair	Yes	Yes	No	There currently are no staffs. The existing gradient causes different readings between bridge RP and the instrument at high flows. The gage is too close to the culvert--a drawdown effect can occur during high flow events. Also, there is a dragon tooth upstream of the culvert, causing backwater effect.	Remedy 1/1: Remove dragon tooth and relocate bridge upstream to minimize drawdown effects. Install outside staff(s) and bubbler system.
5075		24	Thompson Ck above Quimby Rd	Gage	Bubbler	Coyote	Poor, due to orifice problems caused by debris and trash.	Yes	Yes	Yes, to 250 cfs	Flashy seasonal stream. Trash on orifice line, constant filling/ scouring of approach section of gravel	Based on the site visit, this stream gage is ideal and poses no major stream gaging concerns.
5077	2076		Coyote Creek above Coyote Reservoir	Gage	Stage/ (USGS)	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5078		10	Bodfish Ck at Whitehurst Rd	Gage	Bubbler	Uvas/Llagas	Poor, due to poor measuring sections, bubbler painting and input-output differences.	Yes	Requires, definition above 2.58 feet	No	Stream gage works mostly for low to medium flows. Staff upstream too far from orifice line.	Communication orifice is being moved during this SMP season. If Uvas gage is installed, Jeff is willing to discontinue this gage.
5080			Llagas Creek above Chesbro Reservoir	Gage	Bubbler	Uvas/Llagas	Poor, due to leaf buildup on the control and input-output differences.	Yes	Yes	Slope area method	Sediment buries intakes. Concrete is eroding. Steel plate is corroded and bent.	Remedy 1/1: Fix old worn out areas of gage.

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5082	1498	26	Coyote Creek at Madrone (Boys Ranch)	Gage	Stilling Well Basin	Coyote	Good	N/A, No low flows occur	Yes	Yes	Vegetation access issues, nesting birds are a problem	Remedy 1/1: Remove/trim vegetation annually to reduce fire hazards.
5083	1548	2	Upper Penitencia Ck at Dorel Dr	Gage	Bubbler	Coyote	Poor, due to orifice subjected to burial and debris, which affects the control.	Yes	Requires definition above 3.5 feet	No	This gage was owned by USGS, but is currently maintained by the Water District. Sediment buries the orifice bubbler causing inconsisted flow readings. The weir is partially buried and the gage pool is full of sediment. There is no consistent weir pool downstream of existing weir. *The team needs to determine if the FAHCE group requires this gage and/or if the Coyote and Pajaro Program Support Unit may require the gage to be relocated to an alternate site.*	Remedy 1/1: Remove damaged weir and replace with a new weir at the same location or at a nearby stable downstream location. Extend location of orifice bubbler to new weir location, if relocated downstream. The new weir would be higher than the existing one to allow for the creation of a consistent pool downstream. Schedule sediment removal towards the end of the SMP period. For sediment build-up that occurs during non-SMP periods, apply for regulatory permitting to allow removal of sediments in cases when there are no fish present. Consult with a Water District fishery biologist before sediment removal during non-SMP periods. Most of major work is planned for summer 2010.
5084	1538	6	Uvas Creek below Uvas Reservoir	Gage	Bubbler	Uvas/Llagas	Fair to Poor, since station is affected by backwater from the spillway and causes erroneous stage readings	Yes	Yes	Yes, to 144 cfs	Only measures outlet flow and spill flow causes backwater at station. Inflows are 10 feet below weir. For low flow, Need a V-notch weir plate installed to increase sensitivity for stage measurement. Flood control operations plan verification: *shutoff outlet when spilling? (In 2006, Anderson spill and outlet flows were combined).* Question: *If outlet gages measure outlet and spillway flows, how does the operator know outlet flows during combined spillway and outlet flow regime? (Maybe it is best to have 2 separate gages, for outlet and for spillway, like Bullards Bar Reservoir , Yuba County Water Agency)*	Team needs to determine operational scenarios.
5085	2086	23	Llagas Ck at Southside Dr (USGS Coop)	Stage (USGS)	Bubbler	Uvas/Llagas	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	*The channel upstream and downstream has excess vegetation issues that won't be resolved for at least a few years. Based on this concern, can the gage properly measure all flows or just low flows?*	Based on the site visit, this stream gage is ideal and poses no major stream gaging concerns. It is advisable for the site to have annual vegetation removal.

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5086	1525	4	Uvas Ck above W Luchessa Ave	Stage	Bubbler	Uvas/Llagas	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	There is a concern that the channel downstream of the existing stage location experiences a shifting channel and heavy vegetation situation. This location is not adequate for locating a low-flow gaging station, although a high-flow one may be okay. The other low-flow issue is that the Water Supply Operations and Analysis Unit is looking for a low-flow gage closer to Santa Teresa Boulevard, closer to the limits of the recharge zone.	Remedy 1/1: Retain the existing stage and convert to a high flow gage, and simultaneously construct a low flow gage downstream of Santa Teresa (Santa Teresa is the upstream limit of the recharge zone). High flow measurements at Santa Teresa may also be accomplished, but the the upstream railing and fencing of the bridge would require modification to allow for safe access. Based on the team's April 6, 2010 site visit, the best location for a bubbler-type stream gage would be approximately 200 feet downstream of Miller Avenue, where an existing riffle location is located. Jeff Micko is agreeable with this location (K. Stumpf and J. Micko, pers. comm. April 7th). *The team still needs to determine how and where to physically perform high flow gaging--> remote boat measuring test?*
5087		15	Upper Penitencia Ck at Mabury Diversion	Gage	Bubbler	Coyote	Poor, due to sediment transport causing major shifts and communication issues.	Yes, but heavy sedimentation causes shifting to rating	Partially, using SG 5001	No, flow overtops bank for designed flow.	The low-flow only weir, orifice, and staff get buried due to heavy sediment build-up, which causes major shifts to rating. Trees, some of which may be dead, are a safety hazard for District staff. Some of the dead trees have fallen on the gage, already causing damage. This is on private property.	Remedy 1/1: Schedule sediment removal towards in the SMP period w/ operations dam installation. For sediment build-up that occurs during non-SMP periods, apply for regulatory permitting to allow removal of sediments in cases when there are no fish present. Consult with a Water District fishery biologist before sediment removal during non-SMP periods. Area is not a rearing habitat, but a fish passage corridor. Move orifice pipe upstream of the first weir while staying out of dam installation area. SMP removal operations should be paid 1/2 by operations and 1/2 by groundwater. *[Note: this gage impacts low-flow measurements, not high flow measurements, which can be obtained from Station No. 1]*
5088	1445	5	Guadalupe River at Alamitos Fish Ladder	Gage		Guadalupe	Poor due to theoretical rating and leakage around the wooden weir boards.	No	No	No	Existing gage measures low-flows coming through the fish ladder. Need another gage to measure high flows. This low-flow gage has poor theoretical rating--flow rating cannot be verified without measuring section. Prior to the construction of the fish ladder in 1999, stream gage 20 was used to measure low flows. When the fish ladder was constructed, measurements from gage 20 was discontinued. Since then, OPAU has requested, as part of a Capital Project, to have a replacement gage, similar to gage 20, constructed somewhere plausible.	Remedy 1/1: Construct a new stream gage for high/low-flow measurements downstream of Blossom Hill Road. The location has to be somewhere downstream of Blossom Hill Road, just downstream of the major storm drain outlets, and upstream of Highway 85, just upstream of the Cal-Trans pipe outlet. Since the final location of the gage would be affected, future construction would be undertaken after the Upper Guadalupe River Flood Protection Project, Reach 12 construction, which should be completed by winter 2012.

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5089	1495		Coyote Creek below Coyote Percolation Pond	Gage	Bubbler	Coyote	Fair, due to undefined rating and pool turbulence	Yes	Requires, definition above 1.5 feet	N/A	Control subject to moderate algae growth, Gage is designed for OPAU low flow. Stage is either fish ladder and/or gate flow. Does not measure flow when perc. dam is out.	None required.
5090	1497		Coyote Percolation Pond level	Stage	Submersible PT	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Control subject to moderate algae growth	None required.
5091	1496		Adobe Creek at Middlefield Rd	Stage	Stilling Well Basin	Lower Peninsula	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	The communication pipe are buried with sediments, potentially causing inconsistent measurements.	None required.
5092	1491		Upper Silver Creek at Yerba Buena Road	Stage	Radar sensor, solar	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Requires vegetation clearing from time to time to minimize impacts to radar sensor	None required.
5093	1543		Guadalupe Creek above Branham Lane	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No technical issues, but graffiti markings.	None required. However, a new weir and gage may be located in the future at this similar location to provide both low and high flow gaging measurements.
5094	1539		Coyote Creek at Piercy Rd	Stage	Bubbler	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Access road requires clearing bi-annually.	None required.
5095	1488		Los Gatos Creek upstream of Bascom Ave	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Heavy vegetation. Access to pipe not easily accessible.	Remedy 1/1: Remove/trim vegetation.
5096			Saratoga Creek near Saratoga	Stage	USGS	West Valley	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5097	2060		Coyote Creek at Hwy 237	Stage	USGS	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5098	2056		Coyote Creek at William Street	Stage	Ultrasound down looker	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Need to monitor branches to prevent distraction to ultrasound down looker.	None required.
5100	1537		Matadero Creek at Waverley	Stage		Lower Peninsula	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Inactive	None required.
5101	1458		Matadero Creek at El Camino Real	Gage	USGS	Lower Peninsula					No issues	None required.
5102	1502		Lower Silver Creek at Ocala Ave	Stage	Transducer	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.

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5103	1547		El Camino Storm Drain at Willow Ave	Stage	Bubbler	West Valley	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Existing tree to can block solar power panel. There is excessive vegetation growth upstream that may potentially block channel conveyance.	Remedy 1/1: Trim existing tree to prevent solar power panel blockage. Remove excess vegetation growth upstream.
5104	1479		Almaden-Calero Canal at flume	Stage	Alarm	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5105	1487		Almaden-Calero Canal below Upper Bertram Rd	Stage	Alarm	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5107	1504		Guadalupe River at Tasman	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5108	1506		Guadalupe River at Montague Expwy	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Sediment/vegetation issues	Remedy 1/1: Remove/reduce sediment/vegetation.
5109	1533		Guadalupe River at Hwy 101	Gage	USGS	Guadalupe					Tree upstream of Airport car rental road on west bank may affect gage readings.	Remedy 1/1: Remove tree.
5110	1534		Guadalupe River at Trimble Rd	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Sediment/vegetation issues	Remedy 1/1: Remove/reduce sediment/vegetation.
5111	1531		Guadalupe River at Gold Street	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5112			San Francisquito Creek at Stanford	Gage	USGS	Lower Peninsula						None required.
5116	2054		Los Gatos Creek at Kirk Dam	Stage	Transducer	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.

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5058	2062	1	Coyote Ck at Edenvale	Gage	Bubbler	Coyote	Poor, due to clogged intakes and debris-strewn, sedimented control conditions.	Yes	No, need definition between 4 to 6 feet of stage	Yes	Weir location is not located in a stable area of the channel. Several years of heavy vegetation and sediment build-up have undermined the reliability of the weir to provide consistent flow measurements. Central portions of the weir are completely submerged with sediments. Excessive vegetation growth downstream has choked channel conveyance, reducing flow velocities and allowing substantial amount of sediments to fill channel downstream of the weir.	Remedy 1/2: Based on recent discussions with the Coyote and Pajaro Program Support Unit, the first remedial phase for functional improvement of this weir is to maintain the existing weir and remove the heavy vegetation and sediments downstream of the existing weir within the 2010 SMP period. Preliminary Regulatory and County approval would be required prior to June 15. Remedy 2/2: Once the proposed maintenance is completed in summer 2010, the plan is to monitor the success of the work (see how well the gage works). If significant improvement isn't realized within 2 years, then a plan to relocate the gage station to another more suitable location will be implemented.
5083	1548	2	Upper Penitencia Ck at Dorel Dr	Gage	Bubbler	Coyote	Poor, due to orifice subjected to burial and debris, which affects the control.	Yes	Requires definition above 3.5 feet	No	This gage was owned by USGS, but is currently maintained by the Water District. Sediment buries the orifice bubbler causing inconsisted flow readings. The weir is partially buried and the gage pool is full of sediment. There is no consistent weir pool downstream of existing weir. *The team needs to determine if the FAHCE group requires this gage and/or if the Coyote and Pajaro Program Support Unit may require the gage to be relocated to an alternate site.*	Remedy 1/1: Remove damaged weir and replace with a new weir at the same location or at a nearby stable downstream location. Extend location of orifice bubbler to new weir location, if relocated downstream. The new weir would be higher than the existing one to allow for the creation of a consistent pool downstream. Schedule sediment removal towards the end of the SMP period. For sediment build-up that occurs during non-SMP periods, apply for regulatory permitting to allow removal of sediments in cases when there are no fish present. Consult with a Water District fishery biologist before sediment removal during non-SMP periods. Most of major work is planned for summer 2010.
5007		3	Coyote Ck at Coyote	Gage	Stilling Well Basin	Coyote	Poor, lack of stable control but flow gaged monthly	Questionable	Questionable	N/A, gage not designed for high flows.	Currently, this gage only provides low-flow measurements based on estimated natural conditions, since there is no weir downstream of the gage. Due to shifting channel conditions, flow readings are not consistent. This station provides key readings for groundwater balance measurements. Incorporating high-flow measurements is not possible.	Remedy 1/1: Relocate the existing stream gage to a location that would provide consistent and adequate low and high flow gaging measurements. The location must be such that it does not compromise groundwater balance measurements.

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5086	1525	4	Uvas Ck above W Luchessa Ave	Stage	Bubbler	Uvas/Llagas	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	There is a concern that the channel downstream of the existing stage location experiences a shifting channel and heavy vegetation situation. This location is not adequate for locating a low-flow gaging station, although a high-flow one may be okay. The other low-flow issue is that the Water Supply Operations and Analysis Unit is looking for a low-flow gage closer to Santa Teresa Boulevard, closer to the limits of the recharge zone.	Remedy 1/1: Retain the existing stage and convert to a high flow gage, and simultaneously construct a low flow gage downstream of Santa Teresa (Santa Teresa is the upstream limit of the recharge zone). High flow measurements at Santa Teresa may also be accomplished, but the the upstream railing and fencing of the bridge would require modification to allow for safe access. Based on the team's April 6, 2010 site visit, the best location for a bubbler-type stream gage would be approximately 200 feet downstream of Miller Avenue, where an existing riffle location is located. Jeff Micko is agreeable with this location (K. Stumpf and J. Micko, pers. comm. April 7th). *The team still needs to determine how and where to physically perform high flow gaging--> remote boat measuring test?*
5088	1445	5	Guadalupe River at Alamitos Fish Ladder	Gage		Guadalupe	Poor due to theoretical rating and leakage around the wooden weir boards.	No	No	No	Existing gage measures low-flows coming through the fish ladder. Need another gage to measure high flows. This low-flow gage has poor theoretical rating--flow rating cannot be verified without measuring section. Prior to the construction of the fish ladder in 1999, stream gage 20 was used to measure low flows. When the fish ladder was constructed, measurements from gage 20 was discontinued. Since then, OPAU has requested, as part of a Capital Project, to have a replacement gage, similar to gage 20, constructed somewhere plausible.	Remedy 1/1: Construct a new stream gage for high/low-flow measurements downstream of Blossom Hill Road. The location has to be somewhere downstream of Blossom Hill Road, just downstream of the major storm drain outlets, and upstream of Highway 85, just upstream of the Cal-Trans pipe outlet. Since the final location of the gage would be affected, future construction would be undertaken after the Upper Guadalupe River Flood Protection Project, Reach 12 construction, which should be completed by winter 2012.
5084	1538	6	Uvas Creek below Uvas Reservoir	Gage	Bubbler	Uvas/Llagas	Fair to Poor, since station is affected by backwater from the spillway and causes erroneous stage readings	Yes	Yes	Yes, to 144 cfs	Only measures outlet flow and spill flow causes backwater at station. Inflows are 10 feet below weir. For low flow, Need a V-notch weir plate installed to increase sensitivity for stage measurement. Flood control operations plan verification: *shutoff outlet when spilling? (In 2006, Anderson spill and outlet flows were combined).* Question: *If outlet gages measure outlet and spillway flows, how does the operator know outlet flows during combined spillway and outlet flow regime? (Maybe it is best to have 2 separate gages, for outlet and for spillway, like Bullards Bar Reservoir , Yuba County Water Agency)*	Team needs to determine operational scenarios.

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5035		7	Stevens Creek U/S Hwy 85 (by Central Avenue)	Gage		Lower Peninsula	Fair	Yes	Yes	Yes	Sediment buries orifice. There is no consistent weir pool, and the weir is at an angle. Limited access rights. Point of Zero Flow (PZF) fluctuates.	Remedy 1/2 (short term): Extend existing pipe further into middle of channel, to obtain more effective readings, for now. Remedy 2/2 (long term): Relocate gage upstream of Fremont Avenue fish ladder, especially for Operational/FAHCE requirements, or extend bubbler further out. *Need further consultation with team for clarification on further required improvements at this station.*
5043		8	Guadalupe Creek at Hicks Road	Gage	Stilling Well Basin	Guadalupe	Fair	Yes, but need new rating due to facility improvements	No	No	No cableway or nearby bridge for high flow measurements.	Remedy 1/2: Construct a cableway upstream of the gage for measuring high flows. Potentially transfer to USGS for cableway installation and high flow monitoring expertise. FAHCE may need different location at Camden? Remedy 2/2: Measure high flows from upstream of Camden Avenue Bridge *(Ken to validate this alternative. May need Veg. work)*
5024	2050	9	San Tomas Creek above Williams Road	Gage	Stilling Well Basin	West Valley	Fair, since low flows are difficult to measure due to the wide, concrete channel with slow velocities and high flows due to very rapid velocities.	Yes	Yes	Yes, up to 1,000 cfs	Lower communication pipe plugs up and is bent downstream. Stream dry most of the season. The existing staff gage without color is hard to read.	Remedy 1/1: Fix communication pipe. This repair was completed by the Welding group; no reliable material to weld to so a compression fitting was installed. Paint color on the staff gage scale. *Hydrographers plan to add bubbler this year.*
5078		10	Bodfish Ck at Whitehurst Rd	Gage	Bubbler	Uvas/Llagas	Poor, due to poor measuring sections, bubbler painting and input-output differences.	Yes	Requires, definition above 2.58 feet	No	Stream gage works mostly for low to medium flows. Staff upstream too far from orifice line.	Communication orifice is being moved during this SMP season. If Uvas gage is installed, Jeff is willing to discontinue this gage.

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5026	1477	11	Calabazas Creek at Wilcox School	Gage	Stilling Well Basin	West Valley	Poor, staff and gage height relationship hard to establish due to sloped staff.	Yes	Yes, but needs more current meter measurement	No, high flow velocities impact current meter measurements	There are fast 15 fps velocities during high flows, causing waves at the weir. Existing pipes too close to weir, experiencing drawdown effect. A 75-lb weight is not good enough for measuring high flow measurements and many debris. There may be a difference of approximately 1.5 feet when comparing actual data with the HEC-RAS model.	Remedy 1/1: Engineers to review sloped staff and provide conversion table or install vertical staffs. Engineers to review the existing HEC-RAS model, to see if adjustment factor(s) can be provided to hydrographers when they are performing high flow measurements--> One idea: Tapedown from bridge to get average depth, compare w/ model results, measure surface velocities with adjustments, and use a calculation for flow.
5025		12	Saratoga Creek at Pruneridge Avenue	Gage	Stilling Well Basin	West Valley	Poor, lack of measurements, float sitting on mud, missing records.	Yes	Yes	No	The communication pipes are buried and the staffs are destroyed. Currently, data from this gage is not being used by any low-flow customers. However, this site is important for high-flow measurements. Staffs are needed.	Remedy 1/1: Install new staffs and bubbler system at site for High Flow data only.
5065		13	Little Arthur Ck at Redwood Retreat Rd	Gage	Stilling Well Basin	Uvas/Llagas	Poor, due to unstable control issues.	No	No	No	The measuring pipes are buried by sand after sediment removal after 2002. This station primarily measures low-flows; high flow measurements are not required. Currently, for low-flows, data is not really utilized. This station is outside the limits of the recharge zone.	Based on Ken's recommendations, abandon the station and salvage the usable components, if a low flow gage downstream of Santa Teresa Boulevard at Uvas Creek is constructed.
5074		14	Sunnyvale East Channel U/S Hwy 101	Gage	Bubbler	West Valley	Fair	Yes	Yes	No	There currently are no staffs. The existing gradient causes different readings between bridge RP and the instrument at high flows. The gage is too close to the culvert--a drawdown effect can occur during high flow events. Also, there is a dragon tooth upstream of the culvert, causing backwater effect.	Remedy 1/1: Remove dragon tooth and relocate bridge upstream to minimize drawdown effects. Install outside staff(s) and bubbler system.
5087		15	Upper Penitencia Ck at Mabury Diversion	Gage	Bubbler	Coyote	Poor, due to sediment transport causing major shifts and communication issues.	Yes, but heavy sedimentation causes shifting to rating	Partially, using SG 5001	No, flow overtops bank for designed flow.	The low-flow only weir, orifice, and staff get buried due to heavy sediment build-up, which causes major shifts to rating. Trees, some of which may be dead, are a safety hazard for District staff. Some of the dead trees have fallen on the gage, already causing damage. This is on private property.	Remedy 1/1: Schedule sediment removal towards in the SMP period w/ operations dam installation. For sediment build-up that occurs during non-SMP periods, apply for regulatory permitting to allow removal of sediments in cases when there are no fish present. Consult with a Water District fishery biologist before sediment removal during non-SMP periods. Area is not a rearing habitat, but a fish passage corridor. Move orifice pipe upstream of the first weir while staying out of dam installation area. SMP removal operations should be paid 1/2 by operations and 1/2 by groundwater. *[Note: this gage impacts low-flow measurements, not high flow measurements, which can be obtained from Station No. 1]*

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5001	1489	16	Upper Penitencia Ck at Piedmont Rd	Gage	Bubbler	Coyote	Fair	Yes	Yes	Yes, only up to 250 cfs	Minor storms fill upstream and downstream of weir section with sediments, potentially causing inconsistent measurements.	Remedy 1/1: Schedule annual sediment removal towards the end of the SMP period. For sediment build-up that occurs during non-SMP periods, apply for regulatory permitting to allow removal of sediments in cases when there are no fish present. Consult with a Water District fishery biologist before sediment removal during non-SMP periods. Area is not a rearing habitat, but a fish passage corridor
5013	1546	17	Calero Creek below Coyote Reservoir	Gage	Stilling Well Basin	Guadalupe	Good	Yes, subject to vegetation growth/algae and fill	No	No real high flows experienced	Existing large tree in channel about 100 to 150 feet downstream is causing some back water.	Remedy 1/1: Remove tree. *Currently, this is being addressed now, within this year's SMP period.*
5064	1545	18	Berryessa Ck above Calaveras Blvd	Gage	Bubbler	Coyote	Poor, due to effects of painting, aquatic plant growth and undefined rating.	Yes	No	No	This stream gage currently works properly. Low flow measurements will be discontinued at this gage. However, high flow measurements would be required, since this is the only stream gage for Berryessa Creek. According to 2009 Field Assessment, there is poor, lack of measurement range and orifice burial.	There needs to be coordination when high flow measurements will be made at this location. Have engineers decide what stages define low, medium and high flows.
5070		19	Alamitos Creek at Greystone Lane	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	No	Downstream of the weir, it gets sedimented. An existing tree immediately downstream is also adding to the effect. Low-flow measurements is a concern. High-flow measurements are not a concern.	Remedy 1/1: Move the existing tree downstream to another location; raise weir to gain some slope downstream. SMP period max'd for removing/relocating trees in 2009.
5073	1485	20	Canoas Creek at Almaden Expressway	Gage	Stilling Well Basin	Guadalupe	Good, except for periods of backwater and summer periods when algae can backup upstream of the control, causing poor readings.	Yes	Yes	No, since high flows can be affected by backwater effects from Guadalupe River	Backwater from Guadalupe River during high flows affects high flow measurements. The pipes are also too close to the weir. Pipes corroding?	Remedy 1/1: Move station upstream to reduce or eliminate backwater effect from Guadalupe River.
5067	1490	21	Los Gatos Creek below Lexington Reservoir	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	Yes, from theoretical spillway computations	Data questionable at high flows. Steep gradients. Measures Trout Creek flows and other miscellaneous drainage flows. Actual measurements from spillway are questionable.	Remedy 1/1: Slow down flow, gage pool, move gage. This is very low priority for high flow measurement, since this is just downstream of the reservoir.
5032		22	Permanente Creek at Berry Avenue	Gage		Lower Peninsula	Poor	Yes	Yes	No	The area has sedimentation issues, although sediments were removed last year. Sloped staffs require conversion.	Remedy 1/1: Engineers to review sloped staff and provide conversion table or install vertical staffs. Continue to remove sediments, in parallel with incorporating a bubbler-type system or raising the existing communication pipe.

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5085	2086	23	Llagas Ck at Southside Dr (USGS Coop)	Stage (USGS)	Bubbler	Uvas/Llagas	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	*The channel upstream and downstream has excess vegetation issues that won't be resolved for at least a few years. Based on this concern, can the gage properly measure all flows or just low flows?*	Based on the site visit, this stream gage is ideal and poses no major stream gaging concerns. It is advisable for the site to have annual vegetation removal.
5075		24	Thompson Ck above Quimby Rd	Gage	Bubbler	Coyote	Poor, due to orifice problems caused by debris and trash.	Yes	Yes	Yes, to 250 cfs	Flashy seasonal stream. Trash on orifice line, constant filling/ scouring of approach section of gravel	Based on the site visit, this stream gage is ideal and poses no major stream gaging concerns.
5010		25	Fisher Ck at Monterey Rd	Gage	Stilling Well Basin	Coyote	Good, but flows can be affected by backwater when Coyote Creek is bank full.	Yes	Yes	No high flow measuring section, possible backwater effects	Stream gage works mostly for low to medium flows.	Stream gaging measurements is not an issue. The issue with this site is whether or not the source of the flows being measured is coming from overland flows or from the upwelling from the groundwater, or from a combination of both flow sources. *Ken to validate if high flows can be measured from Santa Teresa Boulevard, but that site is quite a distance from this gage station.* Have a hydraulic engineer review/validate double culvert computations. If another station needs to be added to verify low flows for this station, then water supply or groundwater unit should pay for the new station installation.
5082	1498	26	Coyote Creek at Madrone (Boys Ranch)	Gage	Stilling Well Basin	Coyote	Good	N/A, No low flows occur	Yes	Yes	Vegetation access issues, nesting birds are a problem	Remedy 1/1: Remove/trim vegetation annually to reduce fire hazards.
5012		27	Coyote Creek below Coyote Reservoir	Gage	Stilling Well Basin	Coyote	Fair, because of undefined rating	Yes	Yes, up to 200 cfs	Yes, from theoretical spillway computations	Weir crest plate is rusted through, and concrete is eroding. Weeds on access road could be fire/safety hazard. There may be issues with access safety through the concrete bridge, which is owned by a private owner. There is no way to service gage during high flows, since the crossing would have overflows. Not able to verify theoritical rating w/o cableway. Spillway flow verification is not possible, unless measurements of changes to storage from Anderson are accurate.	Remedy 1/1: Need cableway; replace crest plate; perform annual veg removal to clear access road; replace concrete bridge if required.
5003			Upper Penitencia Recharge System at Noble Avenue	Gage	Stilling Well Basin	Coyote	Poor	Few measurements	N/A	N/A	Gage is not in service, and flows are estimated by W. R. Tech's. Stilling well now measures U. Pen. Ck. flows, not diversion flows. Operations is not able to divert full range of flows. Since the diversion channel is no longer in use, excessive vegetation growth completely blocks the diversion channel upstream.	Remedy 1/1: Diversion requires modification. Operations did not want to fund a repair in prior years.
5008			Coyote Canal above Metcalf Chute	Gage	Stilling Well Basin	Coyote	N/A	N/A	N/A	N/A	Inactive	None required.

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5011			Coyote Canal at diversion dam	Gage	Stilling Well Basin	Coyote	N/A	N/A	N/A	N/A	Inactive	None required.
5014	1541		Almaden-Calero Canal at Calero Reservoir	Gage	Stilling Well Basin	Guadalupe	N/A	N/A	N/A	N/A	Inactive	None required.
5015			Almaden-Calero Canal at Almaden Reservoir	Gage	Stilling Well Basin	Guadalupe	Fair due to constant leakage from Almaden-Calero Canal that is less than 1 cfs.	N/A, Canal not operated at low flows	Yes	Not required	Some intake issues. Staff needs to be replaced.	Remedy 1/1: Resolve intake issues and replace staff.
5016	1544		Alamitos Creek below Almaden Reservoir	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	Yes, from theoretical spillway computations	No issues	None required.
5017	1542		Guadalupe Creek below Guadalupe Reservoir	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	Yes, from theoretical spillway computations	No issues	None required.
5018			Golf Creek above McAbee Road	Gage	Stilling Well Basin	Guadalupe	Fair with estimates being poor	Yes	Yes	No	No issues. Monitor algae growth. Operations is requesting for real time telemetry to be installed for this station.	None required.
5021			Ross Creek at Blossom Hill Road	Gage		Guadalupe	Good	Yes, but with shifts due to wear on weir, algae and debris buildup	No	No	No high flow gaging capability.	Remedy 1/1: Install a high-flow gaging access bridge immediately downstream of Blossom Hill Road Bridge. Have an annual schedule for trimming the trees downstream of the gage.
5023	1535		Guadalupe River above Almaden Expressway	USGS (stage)	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Algae growth on weir and some vegetation adjacent above weir	Remedy 1/1: Remove algae on weir and remove/trim some of the vegetation.
5027			Smith Creek above Elam Ave	Gage	Stilling Well Basin	West Valley	Fair	No	No	No	Major algae growth in summer, low flow most of time.	None required.
5029			San Tomas Creek at UPRR near Quito Rd	Gage	Stilling Well Basin	West Valley	Fair	Yes	No	No	Flashy stream. Dry all summer.	None required.
5030			Wildcat Creek at UPRR near Quito Rd	Gage	Stilling Well Basin	West Valley	Poor	Yes, but needs to be redrawn.	No	No	No issues	None required.

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5031	1540		Calabazas Creek at Rainbow Ave	Stage	Bubbler	West Valley	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No control at low flow--orifice is above low flows.	Remedy 1/1: Adjust orifice height.
5033	1456		Hale Creek near Magdalena Ave	Gage	Stilling Well Basin	Lower Peninsula	Fair	Yes	Yes	No	Existing tree can block solar power panel.	Remedy 1/1: Trim existing tree to prevent solar power panel blockage.
5044	1482		Stevens Creek below Stevens Creek Reservoir	Gage	Stilling Well Basin	Lower Peninsula	Fair	Yes	No	Yes, from theoretical spillway computations from Stevens Creek Dam	Occasional Stilling well plugging.	Remedy 1/1: Monitor and replace w/ Bubbler if necessary.
5046			Los Capitancillos Recharge System	Gage	Stilling Well Basin	Guadalupe	Fair	No	No	Not required	Parshall flume may be deteriorating, leading to long term weir installation location if fails.	Remedy 1/1: Monitor and replace as necessary.
5047			Kirk Ditch at head	Gage	Stilling Well Basin	Guadalupe	Fair	No	No	Not required	No issues	None required.
5049			Upper Page Ditch at Dell Ave	Gage	Bubbler	Guadalupe	Good	Yes	Yes	N/A	No issues	None required.
5050	1494		Los Gatos Creek at Lincoln Ave	Gage	Stilling Well Basin	Guadalupe	Poor above 200 cfs	Yes, but gravel fill may cause some shifting	No	No	Some vegetation growth upstream of weir causes negative shift to the rating. Weir has a leak on the right end.	Remedy 1/1: Trim vegetation upstream of weir.
5051	2058		Ross Creek at Cherry Ave	Gage	Stilling Well Basin	Guadalupe	Fair, stage at higher flows is erratic due to flashy flows.	No	No	No	Backwater from Guadalupe River possible. Very flashy system.	None required.
5053			Upper Page Ditch at head	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	Yes	No issues	None required.
5055			Kirk Ditch at Curtner Ave	Gage	Stilling Well Basin	Guadalupe	Fair	No	N/A	N/A	Difficult access point and entrance	Current capital project to relocate on SCVWD property.
5059	1492		Los Gatos Creek at Lark Ave	Gage	Stilling Well Basin	Guadalupe	Good	Yes	Yes	No	Heavy cattail formation on upper westerly side of weir	Remedy 1/1: Remove cattails upstream of weir.
5069			Llagas Creek below Chesbro Reservoir	Gage	Stilling Well Basin	Uvas/Llagas	Good	Yes	Yes	Yes, from theoretical spillway computations	No issues	None required.

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5072	1501		Upper Penitencia Creek diversion to Mabury Recharge Pond	Gage	Bubbler	Coyote	Fair, due to possibility of backwater effects from keeping the pond level too high.	Yes	N/A	N/A	No issues	None required.
5077	2076		Coyote Creek above Coyote Reservoir	Gage	Stage/ (USGS)	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5080			Llagas Creek above Chesbro Reservoir	Gage	Bubbler	Uvas/Llagas	Poor, due to leaf buildup on the control and input-output differences.	Yes	Yes	Slope area method	Sediment buries intakes. Concrete is eroding. Steel plate is corroded and bent.	Remedy 1/1: Fix old worn out areas of gage.
5089	1495		Coyote Creek below Coyote Percolation Pond	Gage	Bubbler	Coyote	Fair, due to undefined rating and pool turbulence	Yes	Requires, definition above 1.5 feet	N/A	Control subject to moderate algae growth, Gage is designed for OPAU low flow. Stage is either fish ladder and/or gate flow. Does not measure flow when perc. dam is out.	None required.
5090	1497		Coyote Percolation Pond level	Stage	Submersible PT	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Control subject to moderate algae growth	None required.
5091	1496		Adobe Creek at Middlefield Rd	Stage	Stilling Well Basin	Lower Peninsula	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	The communication pipe are buried with sediments, potentially causing inconsistent measurements.	None required.
5092	1491		Upper Silver Creek at Yerba Buena Road	Stage	Radar sensor, solar	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Requires vegetation clearing from time to time to minimize impacts to radar sensor	None required.
5093	1543		Guadalupe Creek above Branham Lane	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No technical issues, but graffiti markings.	None required. However, a new weir and gage may be located in the future at this similar location to provide both low and high flow gaging measurements.
5094	1539		Coyote Creek at Piercy Rd	Stage	Bubbler	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Access road requires clearing bi-annually.	None required.
5095	1488		Los Gatos Creek upstream of Bascom Ave	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Heavy vegetation. Access to pipe not easily accessible.	Remedy 1/1: Remove/trim vegetation.
5096			Saratoga Creek near Saratoga	Stage	USGS	West Valley	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.

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5097	2060		Coyote Creek at Hwy 237	Stage	USGS	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5098	2056		Coyote Creek at William Street	Stage	Ultrasound down looker	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Need to monitor branches to prevent distraction to ultrasound down looker.	None required.
5100	1537		Matadero Creek at Waverley	Stage		Lower Peninsula	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Inactive	None required.
5101	1458		Matadero Creek at El Camino Real	Gage	USGS	Lower Peninsula					No issues	None required.
5102	1502		Lower Silver Creek at Ocala Ave	Stage	Transducer	Coyote	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5103	1547		El Camino Storm Drain at Willow Ave	Stage	Bubbler	West Valley	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Existing tree to can block solar power panel. There is excessive vegetation growth upstream that may potentially block channel conveyance.	Remedy 1/1: Trim existing tree to prevent solar power panel blockage. Remove excess vegetation growth upstream.
5104	1479		Almaden-Calero Canal at flume	Stage	Alarm	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5105	1487		Almaden-Calero Canal below Upper Bertram Rd	Stage	Alarm	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5107	1504		Guadalupe River at Tasman	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5108	1506		Guadalupe River at Montague Expwy	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Sediment/vegetation issues	Remedy 1/1: Remove/reduce sediment/vegetation.
5109	1533		Guadalupe River at Hwy 101	Gage	USGS	Guadalupe					Tree upstream of Airport car rental road on west bank may affect gage readings.	Remedy 1/1: Remove tree.
5110	1534		Guadalupe River at Trimble Rd	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	Sediment/vegetation issues	Remedy 1/1: Remove/reduce sediment/vegetation.
5111	1531		Guadalupe River at Gold Street	Stage	Bubbler	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.
5112			San Francisquito Creek at Stanford	Gage	USGS	Lower Peninsula						None required.

Table 1. Existing Santa Clara Valley Water District Stream Gages (sorted by priority)

Sta. No.	Alert ID	Priority	Station Name	Station Type	Instrument Type	Watershed	Quality of Stream Gage Records	Rating Curve defined for low flows?	Rating Curve defined for medium flows?	Rating Curve defined for high flows?	Design and Maintenance Issues	Potential Remedies
5116	2054		Los Gatos Creek at Kirk Dam	Stage	Transducer	Guadalupe	N/A, stage only	N/A, stage only	N/A, stage only	N/A, stage only	No issues	None required.

Table 2. Existing Santa Clara Valley Water District Precipitation Gages (sorted by station)

Sta. No.	Alert ID	Priority	Station Name	Design and Maintenance Issues	Potential Remedies
6001	2065	1	Alamitos	The height of existing willow trees are impacting the operation of the gage.	Trim/remove the willows to allow for proper clearance for the gage. CEQA approval is required. Nearby trees were already removed for dam installation.
6004	2080	19	Almaden Watershed	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6008	1517	20	Biel Ranch	Weed growth potential affecting access road. Can be affected by snow at times.	Trim weeds annually for access and fire safety.
6015	1508	15	Castro Valley	Gage can clog from pollen from redwood trees over 100 feet from gage. Bird droppings can plug funnel.	Gage would require more frequent site visits.
6016	2053		Guadalupe Slough	No issues	None required.
6017	2079	8	Coe Park	A large tall oak tree is hampering the operation of the gage. Can be affected by snow at times.	Oak treek has to be trimmed significantly or relocate gage. CEQA approval is required.
6018	1519	21	Coit Ranch	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6021	2075	16	Coyote Reservoir	There is one 50-ft tall Redwood tree about 45 feet away from the gage. There is one 12-ft tall Oak about 20 feet away from the gage. There are 4 to 7-ft tall Coyote Brush about 10 to 20 feet away and around the gage. There are 1.5 to 3-ft tall weeds around the gage. There are also 30-ft tall large Oaks about 25 feet from away the gage. However, currently, there are no observable impacts to the operation of the gage. Weed growth potential affecting access road. County Parks has trimmed weeds before.	Trim weeds annually for access and fire safety.
6023	1514	17	Curtner Ranch	The gage is situated in an open field and is located deep into the hills thru private properties and roads. The path to the gage runs thru a quarry with slippery dirt road that a regular passenger car may have difficulties passing thru under wet weather conditions. Gage requires more visits because of clogging from bird activity. Funnel has been removed twice by birds. Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6024	2096	3	Dahl Ranch	The gage is surrounded by a number of small oak trees 8 feet away. There is also one 25-ft tall and 50-ft tall large pine trees, that are 30 feet from the gage. The 150-ft long access road has overgrown (Scottish Broom) brush that are about 5 feet tall. There could be potential fire hazard on access road.	Trimming the trees would probably not solve the problem. Relocate gage. CEQA approval is required.
6034	2069	12	Haskins Ranch	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6036	2066		Johnson Ranch	No issues.	None required.
6037	1520	4	Laguna Seca	Gage is located below a large oak tree. The District has no access rights. Watersheds has trimmed tree many times historically.	Address access rights. Trim tree or relocate gage. CEQA approval is required.
6041	2073	13	Leroy Anderson Dam	New bathroom facility location may affect catch. Fenced enclosure gets overgrown with heavy weeds.	No resolution on bathroom location, but remove vegetation annually.

Table 2. Existing Santa Clara Valley Water District Precipitation Gages (sorted by station)

Sta. No.	Alert ID	Priority	Station Name	Design and Maintenance Issues	Potential Remedies
6044	2072		Loma Prieta	No issues. Gage records indicate snowfall during some storms. Rainfall is recorded on days during thawing.	None required.
6048	1521	5	Sunnyvale Hamilton WTP	The gage is situated within a number of trees and is about 10 feet away from a 6-ft chain link fence. The gage is 12 feet from the 8-ft tall dwarf trees/bushes and 15 feet away from 50-ft high tall trees that are lined and each spaced about 10 foot apart.	Trim trees or relocate gage. CEQA approval is required.
6053	1522	6	Maryknoll	The gage is about 12 to 15 feet away from the two closest lined 25 to 30-ft tall pine trees, which are behind a 6-ft chain link fence. The gage is also about 25 feet away from several lined 15 to 20-ft tall pine trees in the opposite direction. The is one 60 to 70-ft tall tree that is about 70 to 80 feet away from the gage. Major impacts.	Trimming the trees would probably not solve the problem. Old wind vanes are near this location. Relocate gage to within proximity of property, if landowner agrees to relocation. CEQA approval is required.
6067	1512	22	Mt Hamilton	Snow can pile up on the catch screen. Gage records indicate snowfall during some storms. Rainfall is recorded on days during thawing. Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6069	2081	23	Mt Umunhum	Gage records indicate snowfall during some storms. Rainfall is recorded on days during thawing. Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6077	1509		Valley Christian	The gage is located near a school's playground and is about 23 feet away from a 15-ft tall tree. It is also about 30 feet away from trees at down slope with projected height of about 15 feet. No impacts.	None required.
6079	1524	10	Rinconada WTP	Vegetation Managagement planted 3 small trees about 30 feet away from the gage. The plants were for mitigation of a warehouse built down by the sludge ponds. Eventually these trees will grow big and impede the operation of the gage.	Relocate trees. Need District and CEQA approval.
6098	1518	18	Shanti Ashrama	Can be affected by snow at times. Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6099	2070		Penitencia WTP	The gage is clear from impedances. One 10-ft tall tree is about 30 feet away and a group of 15-ft tall trees are at least 40 feet away.	None required.
6100	1510		Stevens Creek Reservoir	The gage is about 30 feet away from a few trees of about 12-ft height that are located downslope of the gage ground, with projected effective heights of about 8 feet. The gage is also about 40 feet away from a tree of about 40-ft tall. No impacts.	None required.
6102	2067		UTC	Bird droppings can plug funnel. [Note: staff usually schedules and arranges for a guide to service this station.]	None required.
6104	2057		Uvas Reservoir	No issues.	None required.
6108	1511		West Yard	No issues.	None required.

Table 2. Existing Santa Clara Valley Water District Precipitation Gages (sorted by station)

Sta. No.	Alert ID	Priority	Station Name	Design and Maintenance Issues	Potential Remedies
6121	1515	7	Mtn. View Corp. Yard	This gage is located at the corner of the entrance to the Corp. Yard Employee's Parking lot. It is very close to the corner fences with trees on both sides of the fences. The gauge is about 6 feet away from the trees to the north that are about 20-ft tall. The gage is also about 7 feet away from the tree brushed to its west which is about 10 to 12 feet high. This gage is impacted by the trees from both north and west sides.	Trim the trees. CEQA approval is required.
6123	1526	14	Guadalupe Watershed	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6125	1527		Vasona Pump Station	No issues.	None required.
6127	2071		Cow Ridge	No major issues. Can be affected by snow at times.	None required.
6128	1513		Calero Watershed	No issues.	None required.
6129	2099	11	Palo Alto	There are safety concerns with regards to the gage housing and old rain gage. There was an attempt to remove the housing and rain gage in the past, but environmental clearance was not successful.	Re-attempt to change housing and rain gage again. CEQA approval would be required.
6131	1453		City of San Jose	No issues.	None required.
6132	1516	2	Evergreen	Gage is impacted by one oak tree.	Trim tree or relocate gage. CEQA approval is required.
6134	1529		Church Ave. Perc. Ponds	Site is surrounded by buildings, but there have not been any concerns on gage operation.	None required.
6135	1530		Uvas Canyon County Park	No issues.	None required.
6136	1503	9	Morgan Hill	Gage is located behind a number of 25 to 30-foot trees, on the southerly side.	Relocate gage or trim trees. CEQA approval is required. Also, site needs weed control, as gage is located within weeds--Star Thistle.
6138	2068	24	Banjo Point	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.

Note: *Add crown reduction for pertinent vegetation/tree cutting work.*

Table 2. Existing Santa Clara Valley Water District Precipitation Gages (sorted by priority)

Sta. No.	Alert ID	Priority	Station Name	Design and Maintenance Issues	Potential Remedies
6001	2065	1	Alamitos	The height of existing willow trees are impacting the operation of the gage.	Trim/remove the willows to allow for proper clearance for the gage. CEQA approval is required. Nearby trees were already removed for dam installation.
6132	1516	2	Evergreen	Gage is impacted by one oak tree.	Trim tree or relocate gage. CEQA approval is required.
6024	2096	3	Dahl Ranch	The gage is surrounded by a number of small oak trees 8 feet away. There is also one 25-ft tall and 50-ft tall large pine trees, that are 30 feet from the gage. The 150-ft long access road has overgrown (Scottish Broom) brush that are about 5 feet tall. There could be potential fire hazard on access road.	Trimming the trees would probably not solve the problem. Relocate gage. CEQA approval is required.
6037	1520	4	Laguna Seca	Gage is located below a large oak tree. The District has no access rights. Watersheds has trimmed tree many times historically.	Address access rights. Trim tree or relocate gage. CEQA approval is required.
6048	1521	5	Sunnyvale Hamilton WTP	The gage is situated within a number of trees and is about 10 feet away from a 6-ft chain link fence. The gage is 12 feet from the 8-ft tall dwarf trees/bushes and 15 feet away from 50-ft high tall trees that are lined and each spaced about 10 foot apart.	Trim trees or relocate gage. CEQA approval is required.
6053	1522	6	Maryknoll	The gage is about 12 to 15 feet away from the two closest lined 25 to 30-ft tall pine trees, which are behind a 6-ft chain link fence. The gage is also about 25 feet away from several lined 15 to 20-ft tall pine trees in the opposite direction. The is one 60 to 70-ft tall tree that is about 70 to 80 feet away from the gage. Major impacts.	Trimming the trees would probably not solve the problem. Old wind vanes are near this location. Relocate gage to within proximity of property, if landowner agrees to relocation. CEQA approval is required.
6121	1515	7	Mtn. View Corp. Yard	This gage is located at the corner of the entrance to the Corp. Yard Employee's Parking lot. It is very close to the corner fences with trees on both sides of the fences. The gauge is about 6 feet away from the trees to the north that are about 20-ft tall. The gage is also about 7 feet away from the tree brushed to its west which is about 10 to 12 feet high. This gage is impacted by the trees from both north and west sides.	Trim the trees. CEQA approval is required.
6017	2079	8	Coe Park	A large tall oak tree is hampering the operation of the gage. Can be affected by snow at times.	Oak treek has to be trimmed significantly or relocate gage. CEQA approval is required.
6136	1503	9	Morgan Hill	Gage is located behind a number of 25 to 30-foot trees, on the southerly side.	Relocate gage or trim trees. CEQA approval is required. Also, site needs weed control, as gage is located within weeds--Star Thistle.
6079	1524	10	Rinconada WTP	Vegetation Managagement planted 3 small trees about 30 feet away from the gage. The plants were for mitigation of a warehouse built down by the sludge ponds. Eventually these trees will grow big and impede the operation of the gage.	Relocate trees. Need District and CEQA approval.
6129	2099	11	Palo Alto	There are safety concerns with regards to the gage housing and old rain gage. There was an attempt to remove the housing and rain gage in the past, but environmental clearance was not successful.	Re-attempt to change housing and rain gage again. CEQA approval would be required.
6034	2069	12	Haskins Ranch	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6041	2073	13	Leroy Anderson Dam	New bathroom facility location may affect catch. Fenced enclosure gets overgrown with heavy weeds.	No resolution on bathroom location, but remove vegetation annually.

Table 2. Existing Santa Clara Valley Water District Precipitation Gages (sorted by priority)

Sta. No.	Alert ID	Priority	Station Name	Design and Maintenance Issues	Potential Remedies
6123	1526	14	Guadalupe Watershed	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6015	1508	15	Castro Valley	Gage can clog from pollen from redwood trees over 100 feet from gage. Bird droppings can plug funnel.	Gage would require more frequent site visits.
6021	2075	16	Coyote Reservoir	There is one 50-ft tall Redwood tree about 45 feet away from the gage. There is one 12-ft tall Oak about 20 feet away from the gage. There are 4 to 7-ft tall Coyote Brush about 10 to 20 feet away and around the gage. There are 1.5 to 3-ft tall weeds around the gage. There are also 30-ft tall large Oaks about 25 feet from away the gage. However, currently, there are no observable impacts to the operation of the gage. Weed growth potential affecting access road. County Parks has trimmed weeds before.	Trim weeds annually for access and fire safety.
6023	1514	17	Curtner Ranch	The gage is situated in an open field and is located deep into the hills thru private properties and roads. The path to the gage runs thru a quarry with slippery dirt road that a regular passenger car may have difficulties passing thru under wet weather conditions. Gage requires more visits because of clogging from bird activity. Funnel has been removed twice by birds. Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6098	1518	18	Shanti Ashrama	Can be affected by snow at times. Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6004	2080	19	Almaden Watershed	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6008	1517	20	Biel Ranch	Weed growth potential affecting access road. Can be affected by snow at times.	Trim weeds annually for access and fire safety.
6018	1519	21	Coit Ranch	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6067	1512	22	Mt Hamilton	Snow can pile up on the catch screen. Gage records indicate snowfall during some storms. Rainfall is recorded on days during thawing. Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6069	2081	23	Mt Umunhum	Gage records indicate snowfall during some storms. Rainfall is recorded on days during thawing. Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6138	2068	24	Banjo Point	Weed growth potential affecting access road.	Trim weeds annually for access and fire safety.
6016	2053		Guadalupe Slough	No issues	None required.
6036	2066		Johnson Ranch	No issues.	None required.
6044	2072		Loma Prieta	No issues. Gage records indicate snowfall during some storms. Rainfall is recorded on days during thawing.	None required.

Table 2. Existing Santa Clara Valley Water District Precipitation Gages (sorted by priority)

Sta. No.	Alert ID	Priority	Station Name	Design and Maintenance Issues	Potential Remedies
6077	1509		Valley Christian	The gage is located near a school's playground and is about 23 feet away from a 15-ft tall tree. It is also about 30 feet away from trees at down slope with projected height of about 15 feet. No impacts.	None required.
6099	2070		Penitencia WTP	The gage is clear from impedances. One 10-ft tall tree is about 30 feet away and a group of 15-ft tall trees are at least 40 feet away.	None required.
6100	1510		Stevens Creek Reservoir	The gage is about 30 feet away from a few trees of about 12-ft height that are located downslope of the gage ground, with projected effective heights of about 8 feet. The gage is also about 40 feet away from a tree of about 40-ft tall. No impacts.	None required.
6102	2067		UTC	Bird droppings can plug funnel. [Note: staff usually schedules and arranges for a guide to service this station.]	None required.
6104	2057		Uvas Reservoir	No issues.	None required.
6108	1511		West Yard	No issues.	None required.
6125	1527		Vasona Pump Station	No issues.	None required.
6127	2071		Cow Ridge	No major issues. Can be affected by snow at times.	None required.
6128	1513		Calero Watershed	No issues.	None required.
6131	1453		City of San Jose	No issues.	None required.
6134	1529		Church Ave. Perc. Ponds	Site is surrounded by buildings, but there have not been any concerns on gage operation.	None required.
6135	1530		Uvas Canyon County Park	No issues.	None required.

Note: *Add crown reduction for pertinent vegetation/tree cutting work.*

PHOTOS OF ACTIVE STREAM GAGES/STAGES

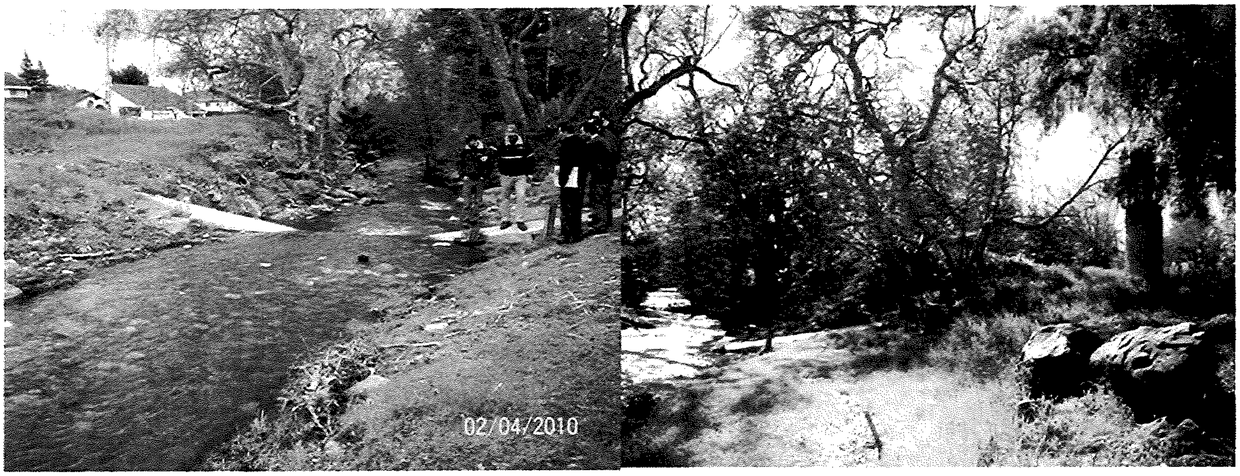


Figure 3 Station 5001 – Upper Penitencia Creek downstream of Piedmont Road

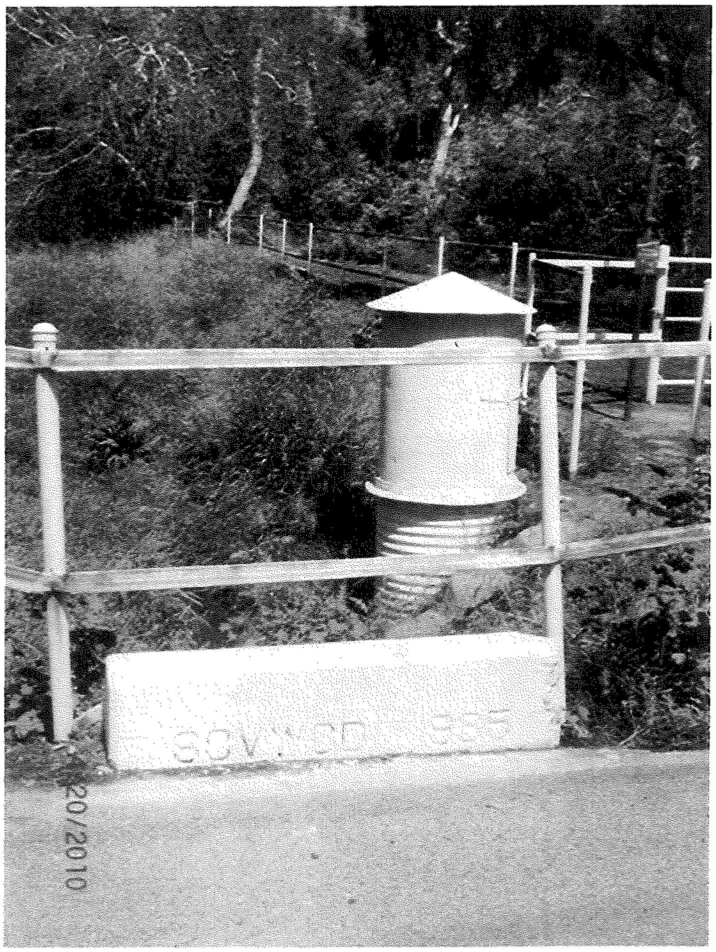


Figure 4 Station 5003 – Upper Penitencia Recharge System at Noble Avenue

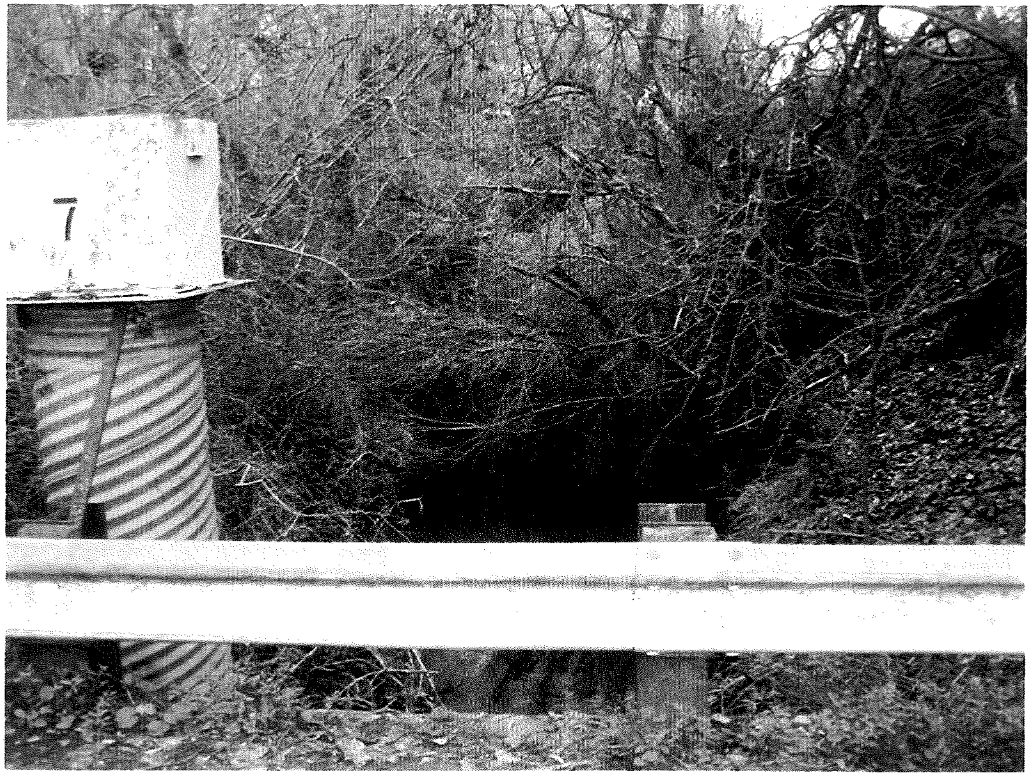


Figure 5 Station 5007 – Coyote Creek at Coyote

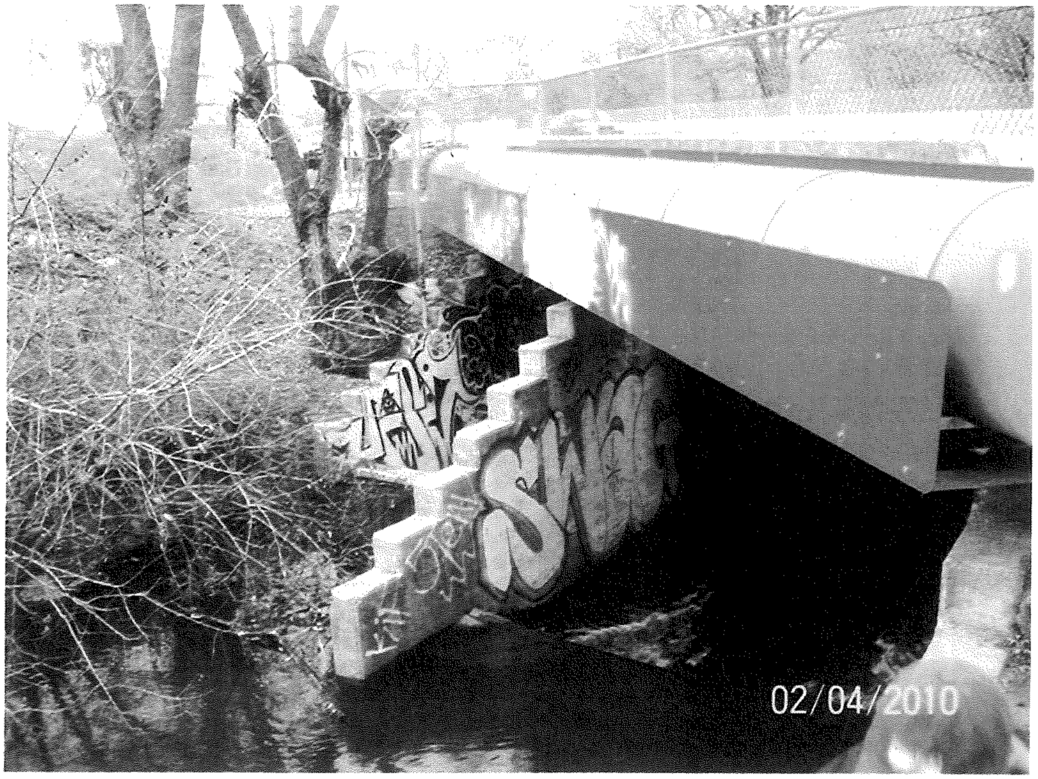
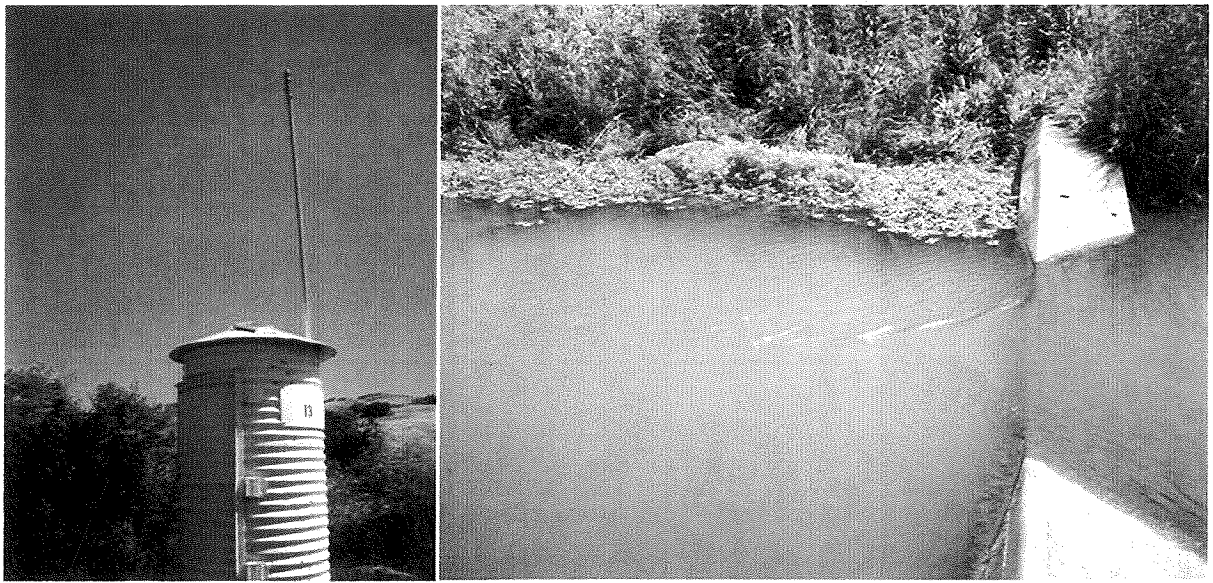
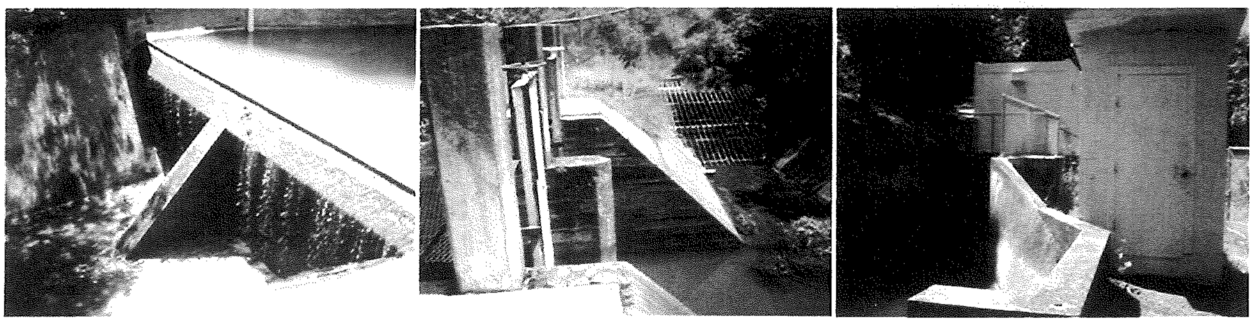


Figure 6 Station 5010 – Fisher Creek at Monterey Road

Figures 7a-7b Station 5012 – Coyote Creek below Coyote Reservoir

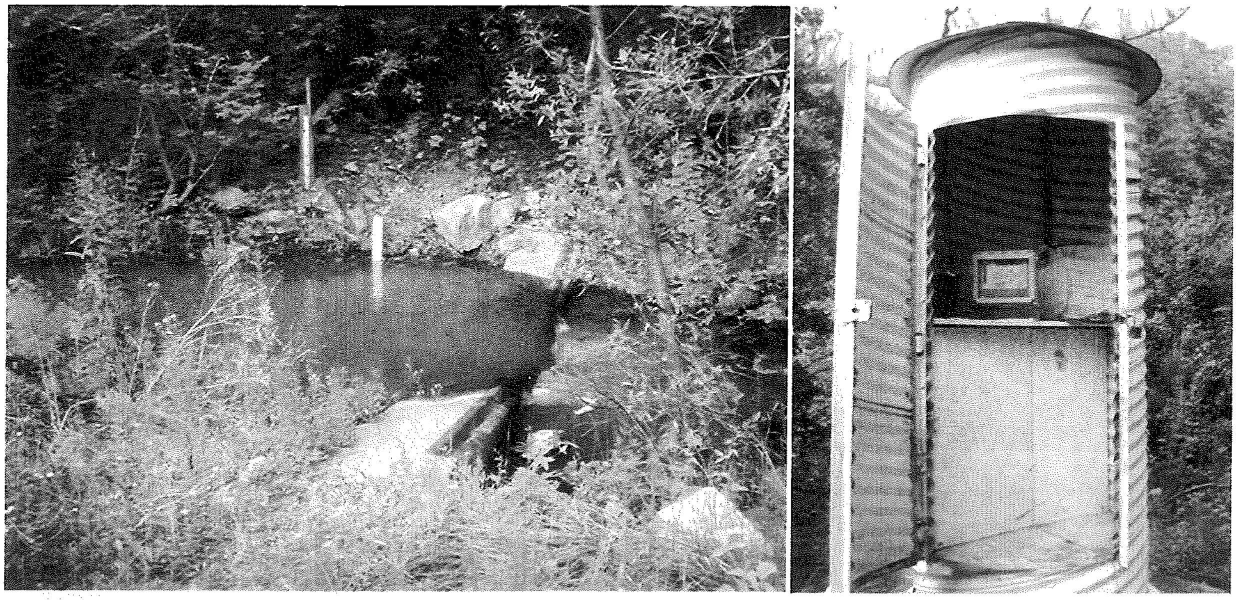


Figures 8a-8b Station 5013 – Calero Creek below Calero Reservoir

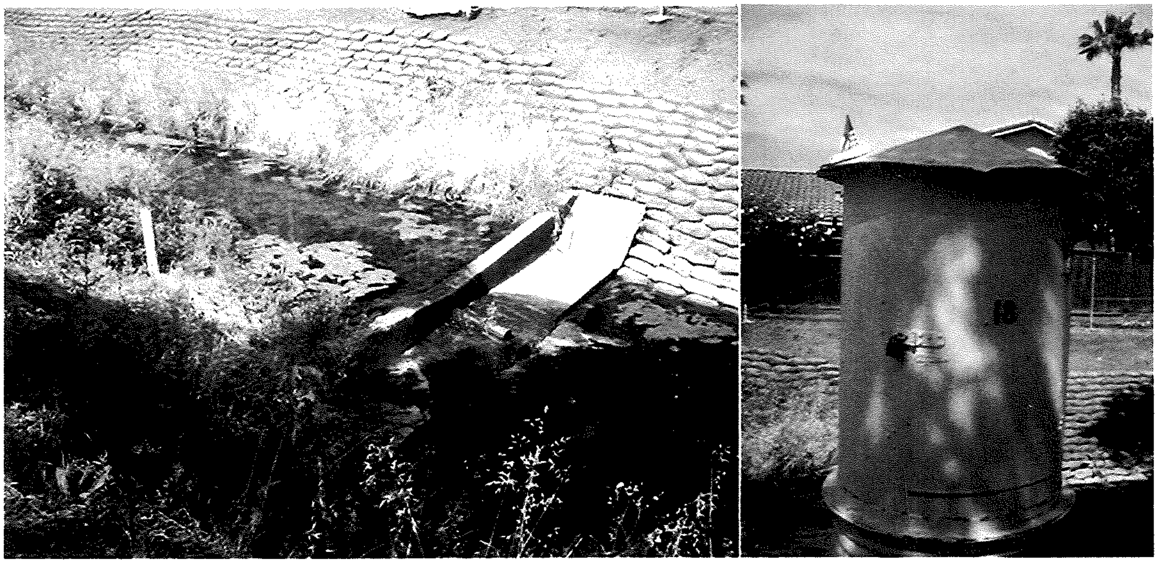


Figures 9a-9c Station 5015 – Almaden-Calero Canal at Almaden Reservoir

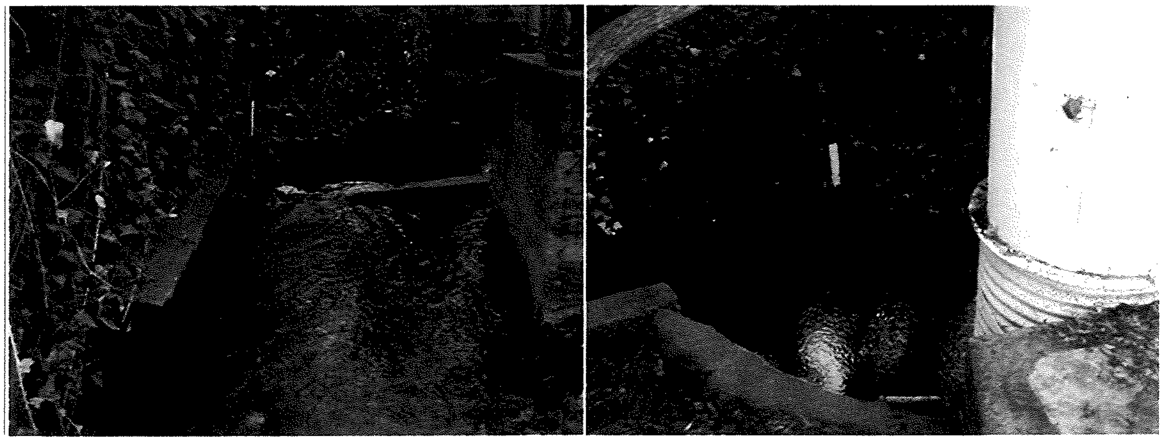
Figures 10a-10b Station 5016 – Alamitos Creek below Almaden Reservoir



Figures 11a-11b Station 5017 – Guadalupe Creek below Guadalupe Reservoir



Figures 12a-12b Station 5018 – Golf Creek above McAbee Road



Figures 13a-13b Station 5021 – Ross Creek at Blossom Hill Road

Figures 14a-14b Station 5023 – Guadalupe River above Almaden Expressway (USGS)

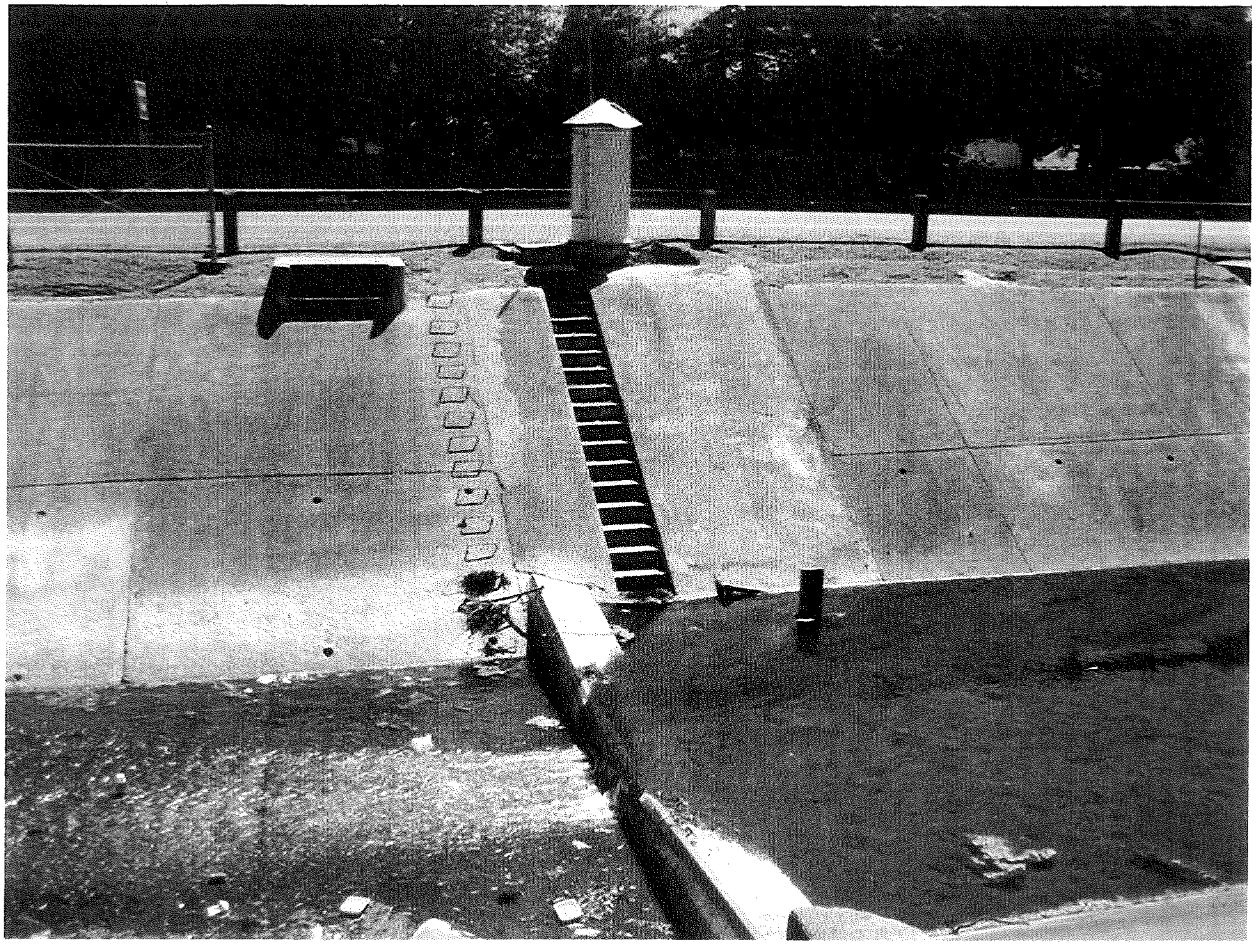
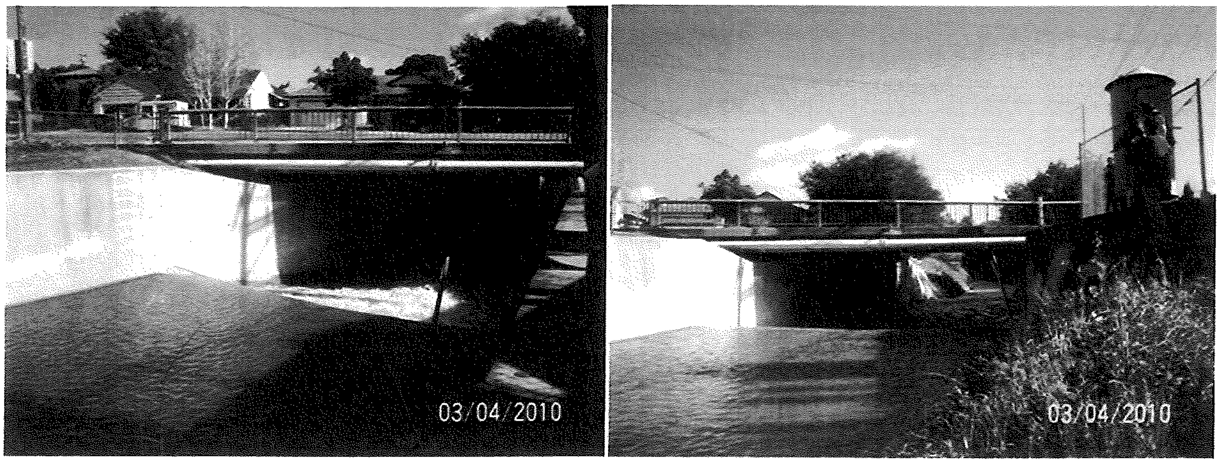
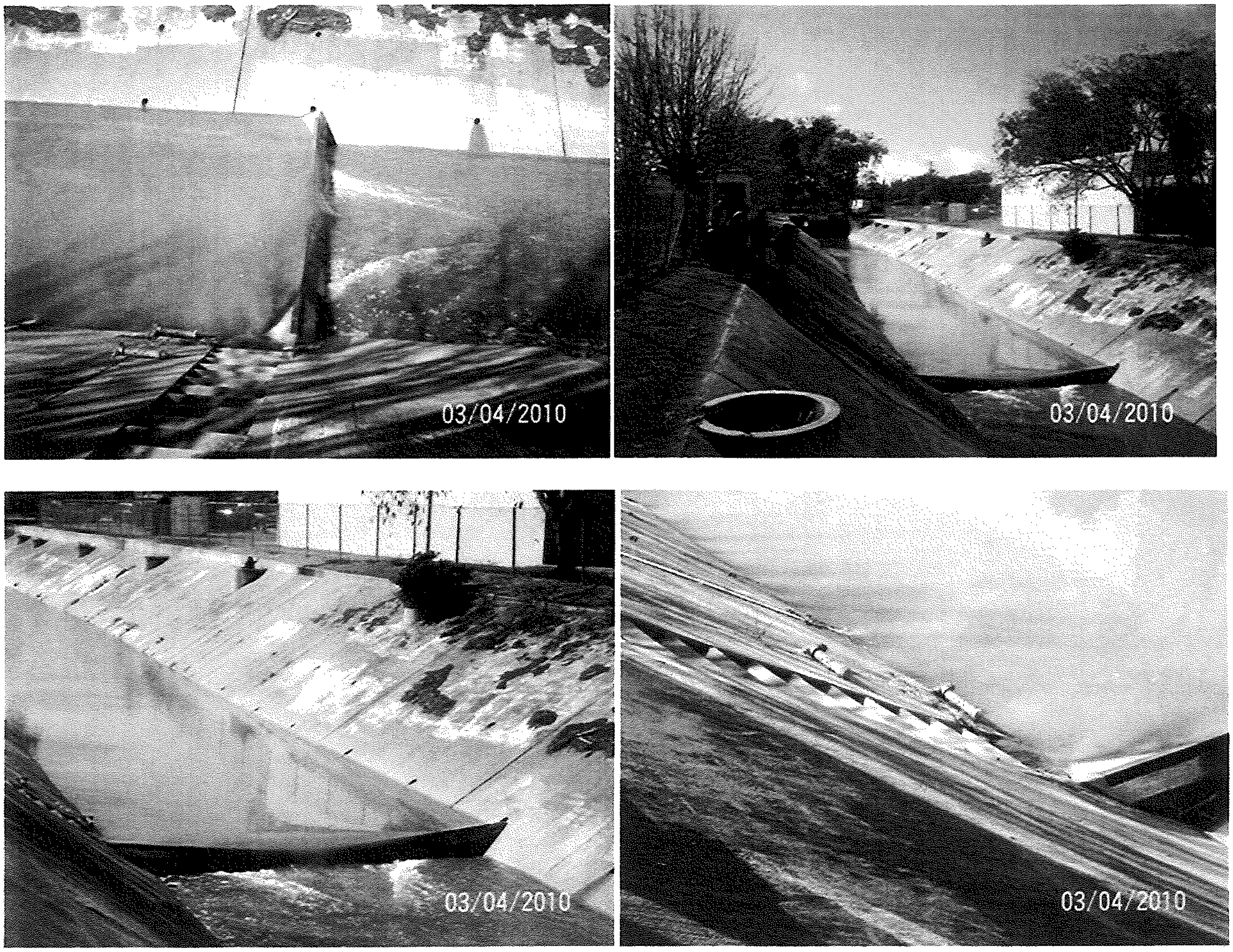


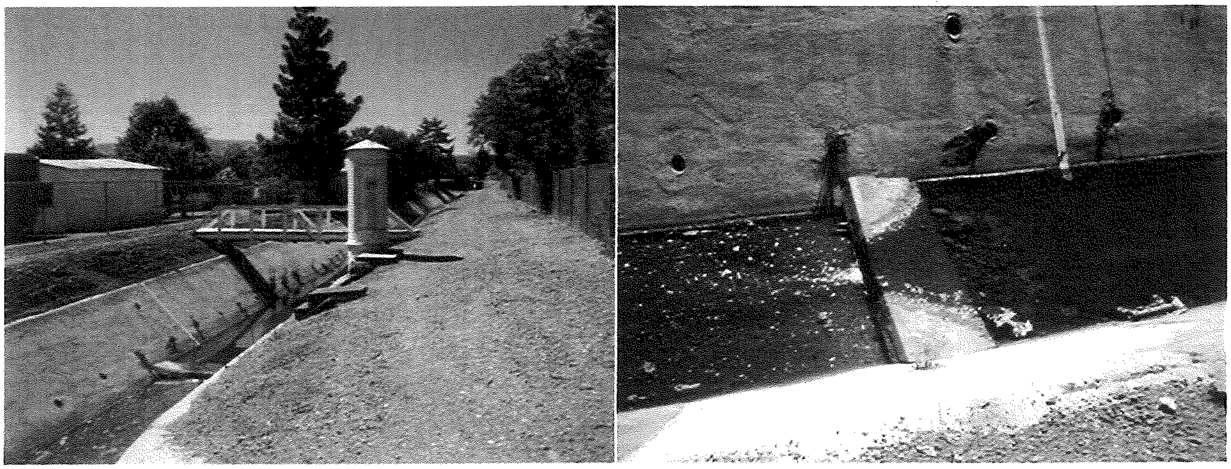
Figure 15 Station 5024 – San Tomas Creek above Williams Road



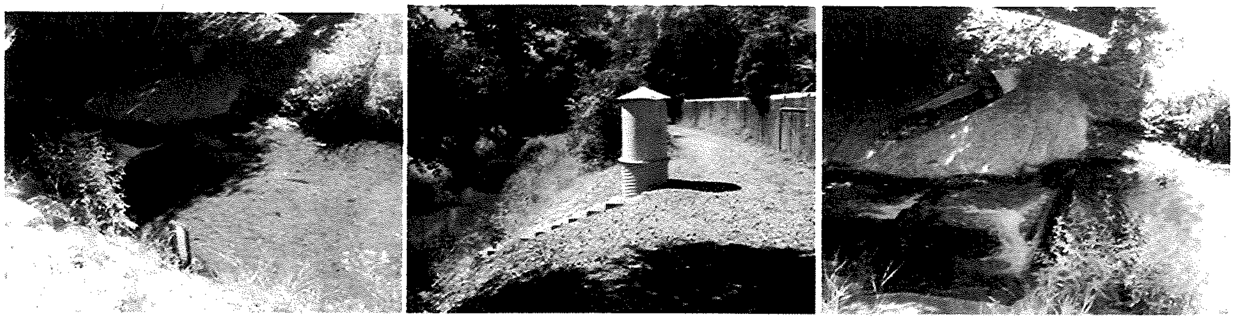
Figures 16a-16b Station 5025 – Saratoga Creek at Pruneridge Avenue



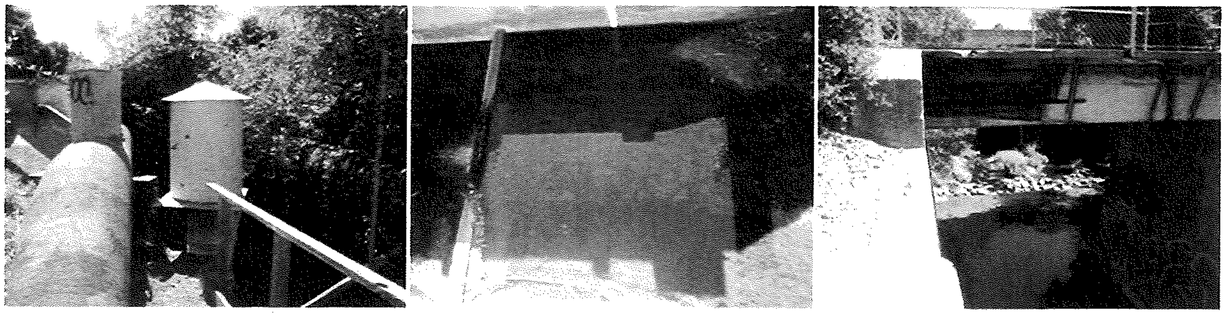
Figures 17a-17d Station 5026 – Calabazas Creek at Wilcox School



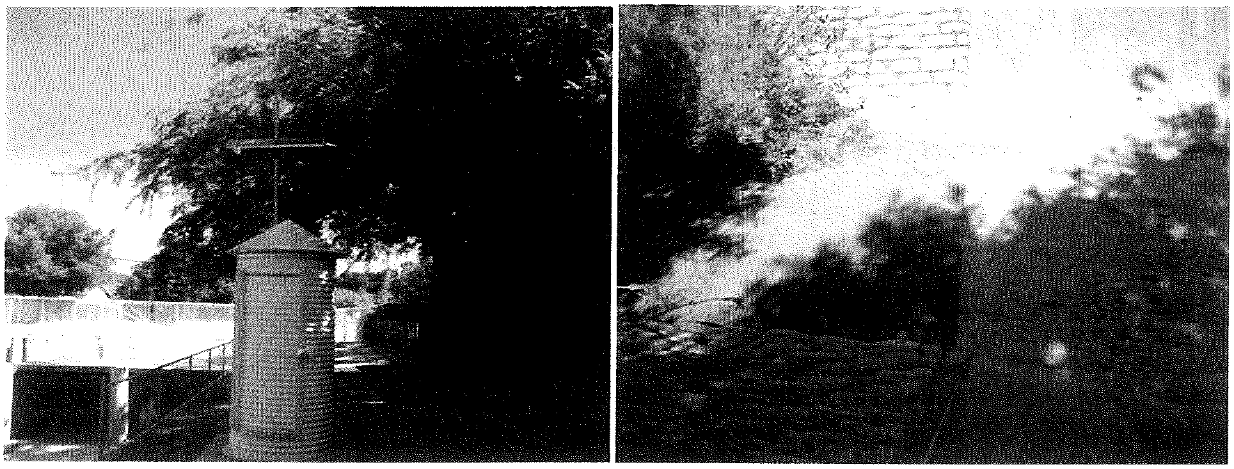
Figures 18a-18b Station 5027 – Smith Creek above Elam Avenue



Figures 19a-19c Station 5029 – San Tomas Creek at UPRR near Quito Road



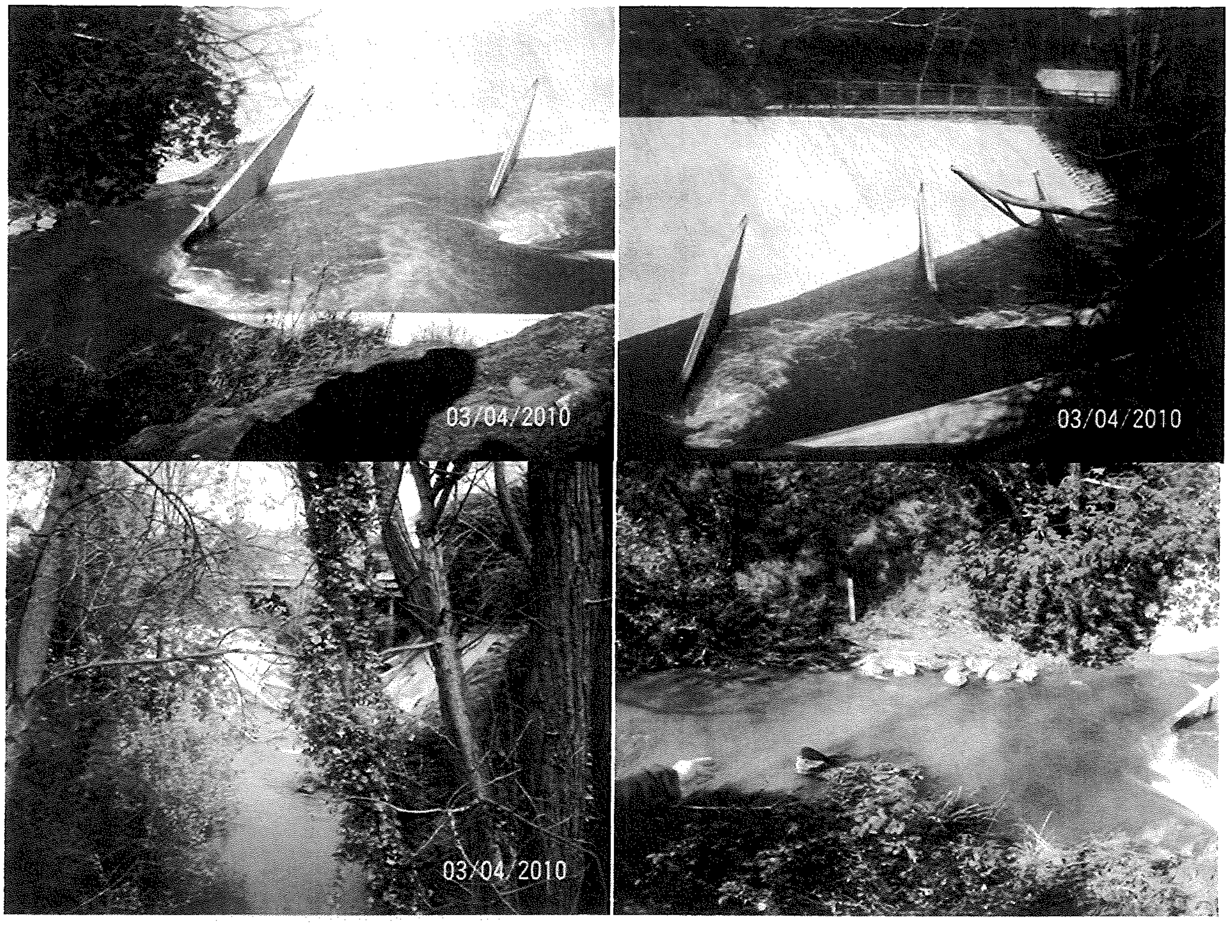
Figures 20a-20c Station 5030 – Wildcat Creek at UPRR near Quito Road



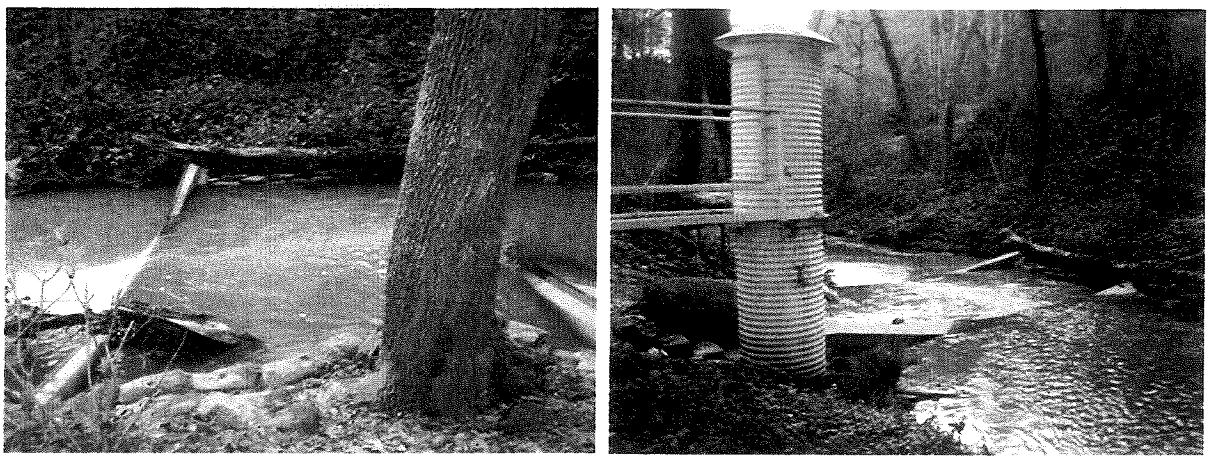
Figures 21a-21b Station 5031 – Calabazas Creek at Rainbow Avenue

Figures 22a-22b Station 5032 – Permanente Creek at Berry Avenue

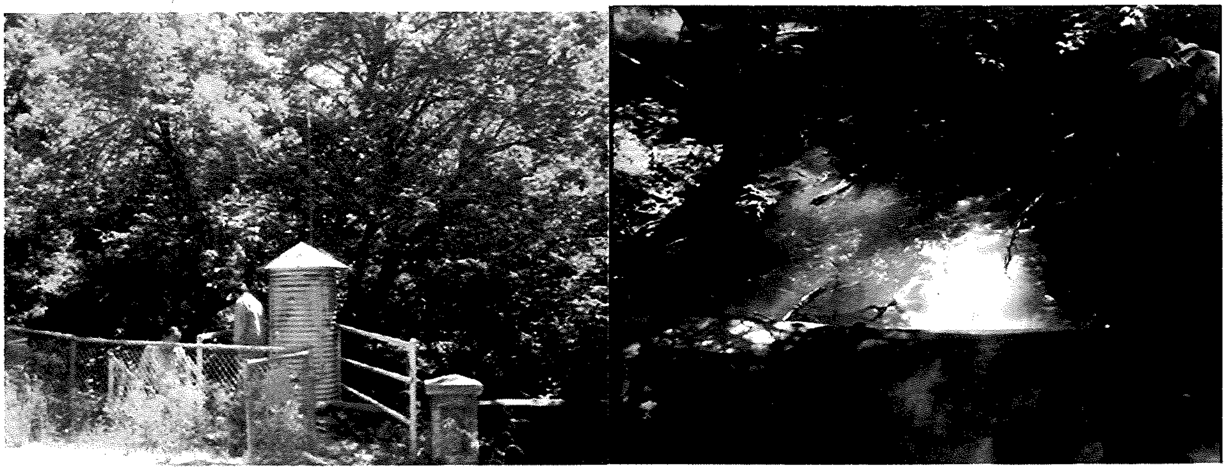
Figures 23a-23b Station 5033 – Hale Creek near Madgalena Road



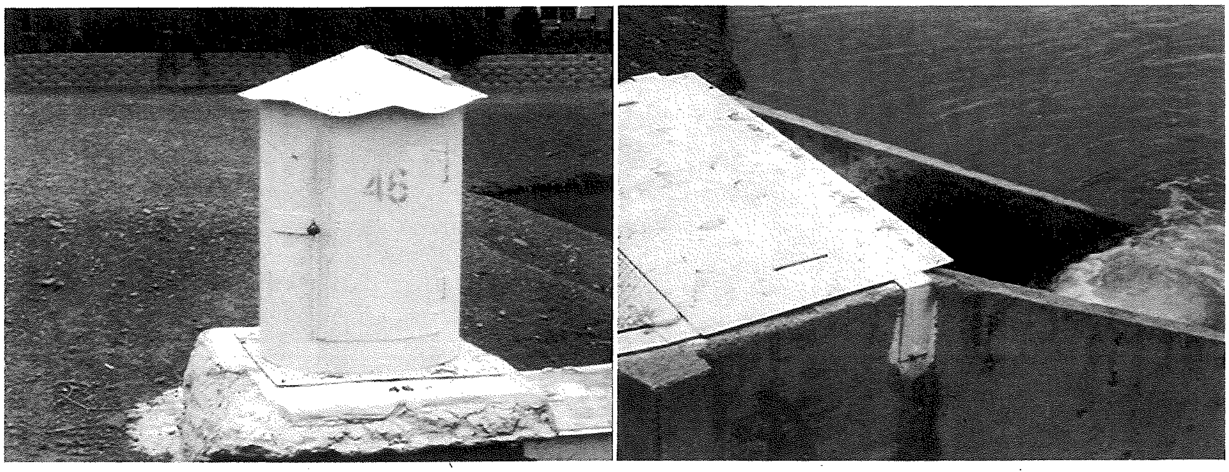
Figures 24a-24d Station 5035 – Stevens Creek upstream of Highway 85 (by Central Avenue)



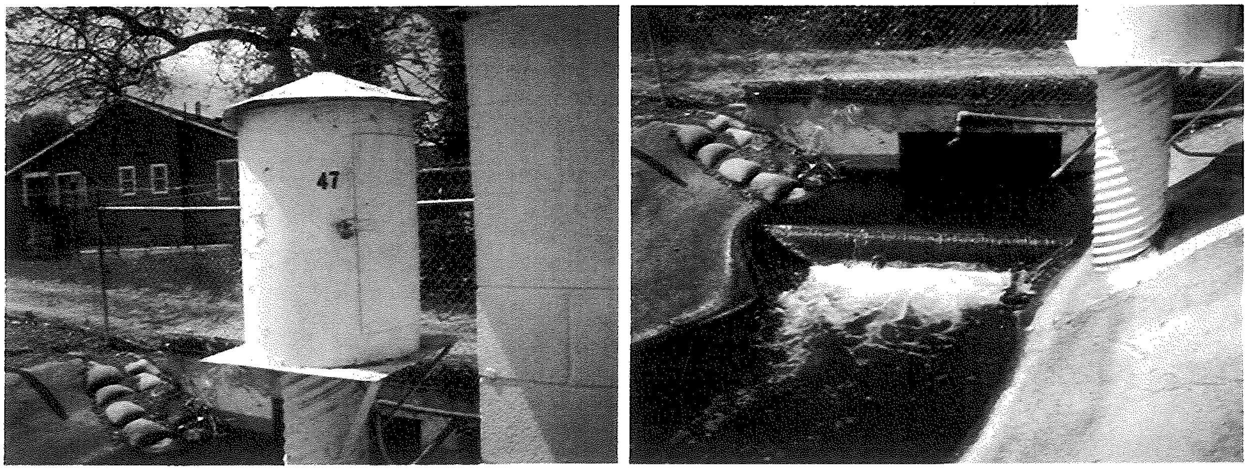
Figures 25a-25b Station 5043 – Guadalupe Creek at Hicks Road



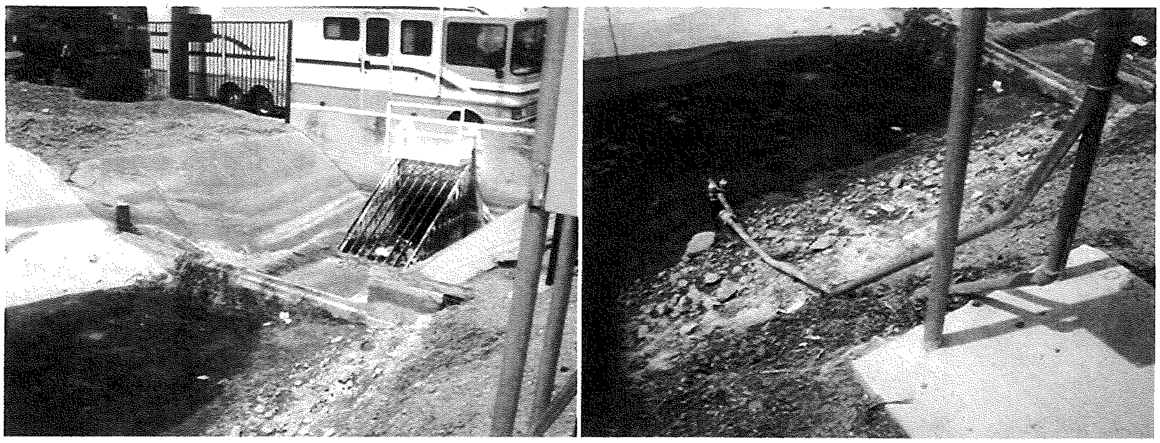
Figures 26a-26b Station 5044 – Stevens Creek below Stevens Creek Reservoir



Figures 27a-27b Station 5046 – Los Capitancillos Recharge System

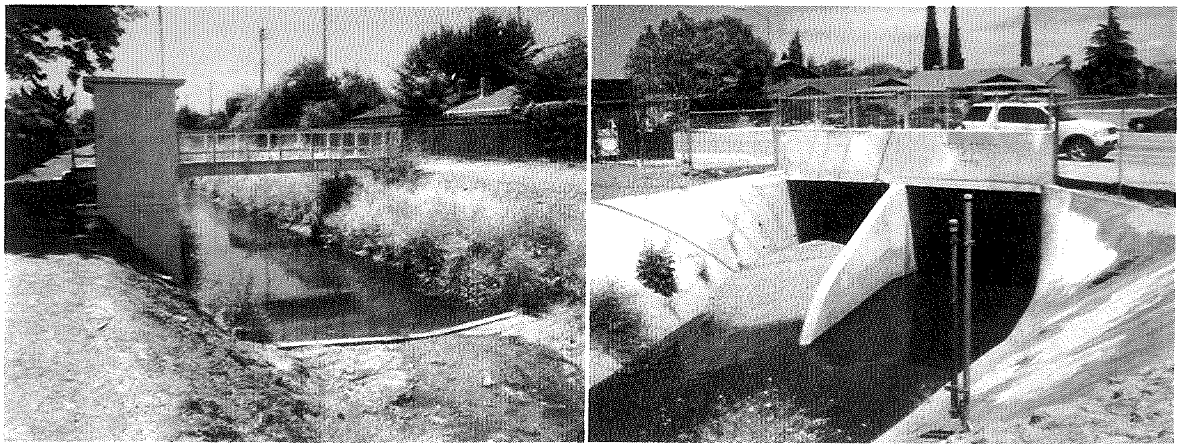


Figures 28a-28b Station 5047 – Kirk Ditch at head

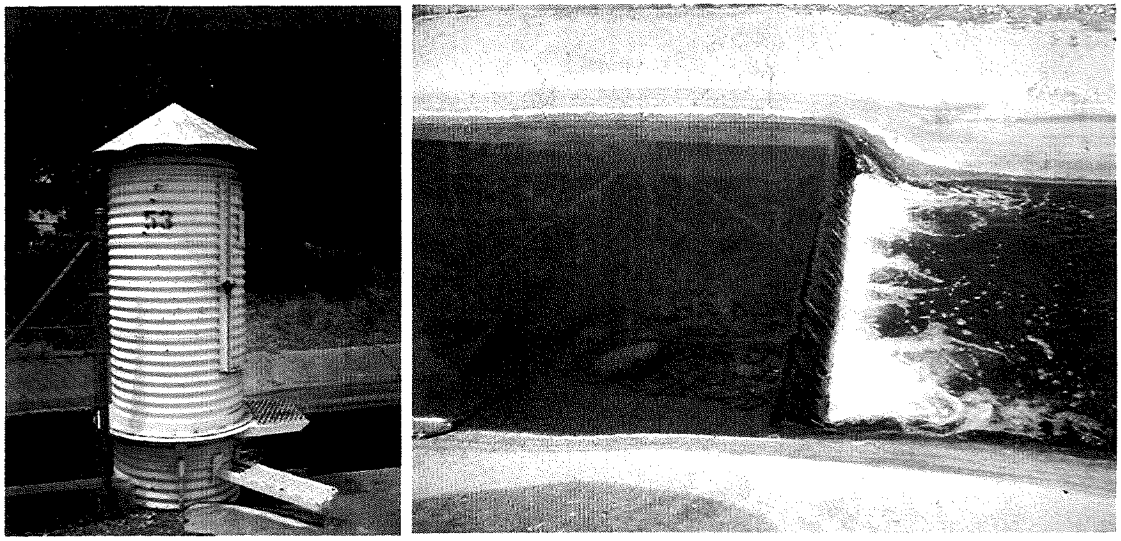


Figures 29a-29b Station 5049 – Upper Page Ditch at Dell Avenue

Figures 30a-30b Station 5050 – Los Gatos Creek at Lincoln Avenue



Figures 31a-31b Station 5051 – Ross Creek at Cherry Avenue



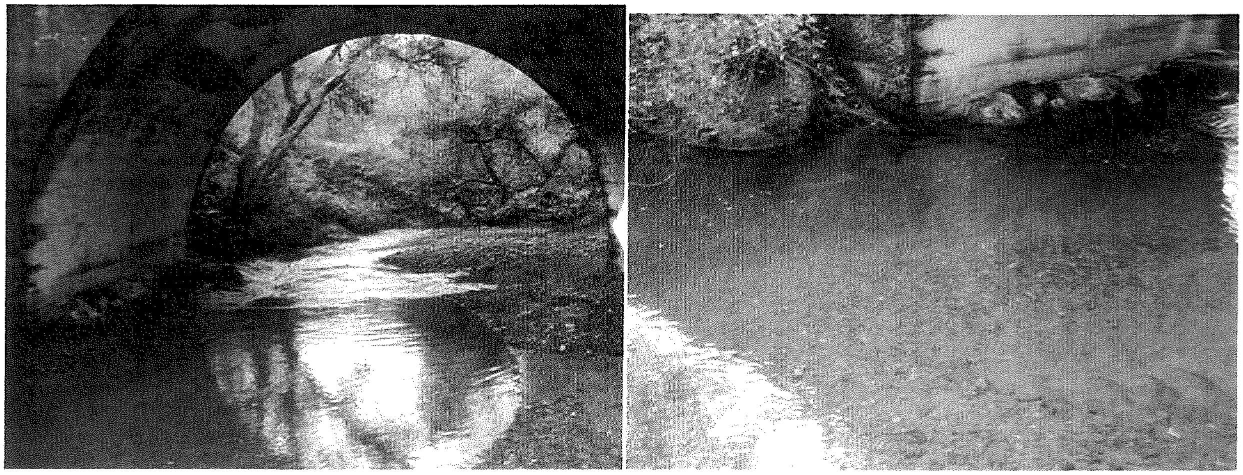
Figures 32a-32b Station 5053 – Upper Page Ditch at head

Figures 33a-33b Station 5055 – Kirk Ditch at White Oaks-Curtner

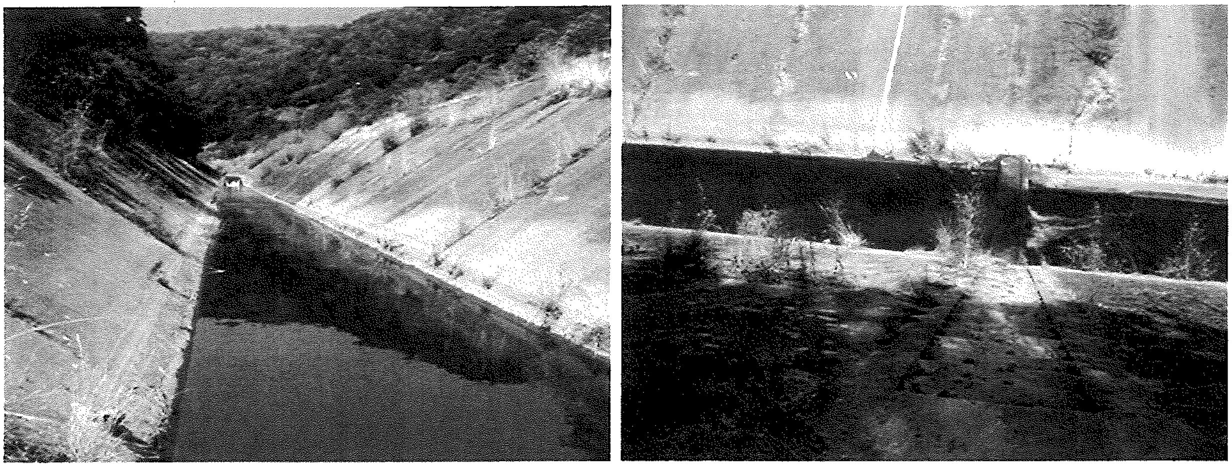
Figures 34a-34b Station 5058 – Coyote Creek at Edenvale

Figures 35a-35b Station 5059 – Los Gatos Creek at Lark Avenue

Figures 36a-36b Station 5064 – Berryessa Creek above Calaveras Boulevard

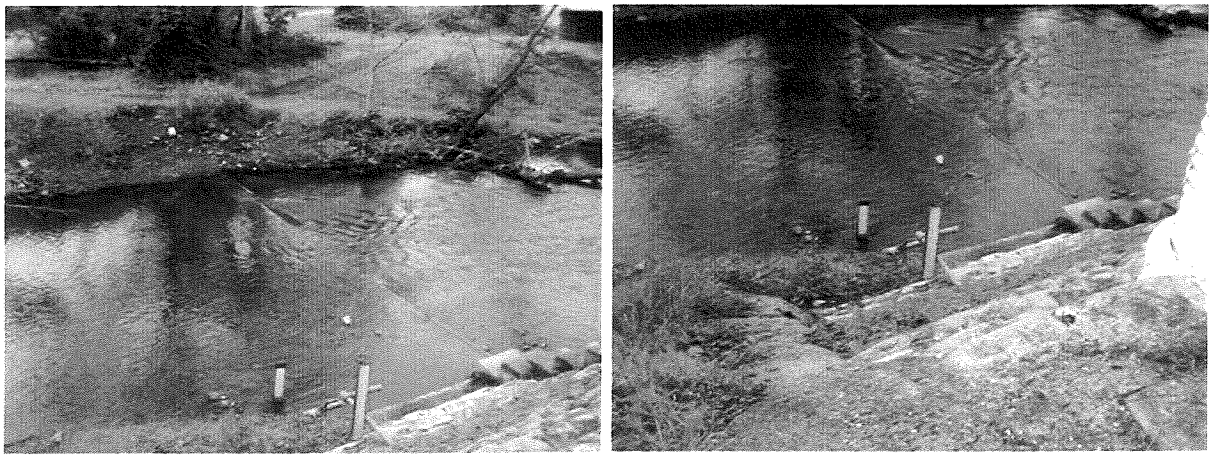


Figures 37a-37b Station 5065 – Little Arthur Creek @ Redwood Retreat Road
[Note: sediment buries weir (right photo)]



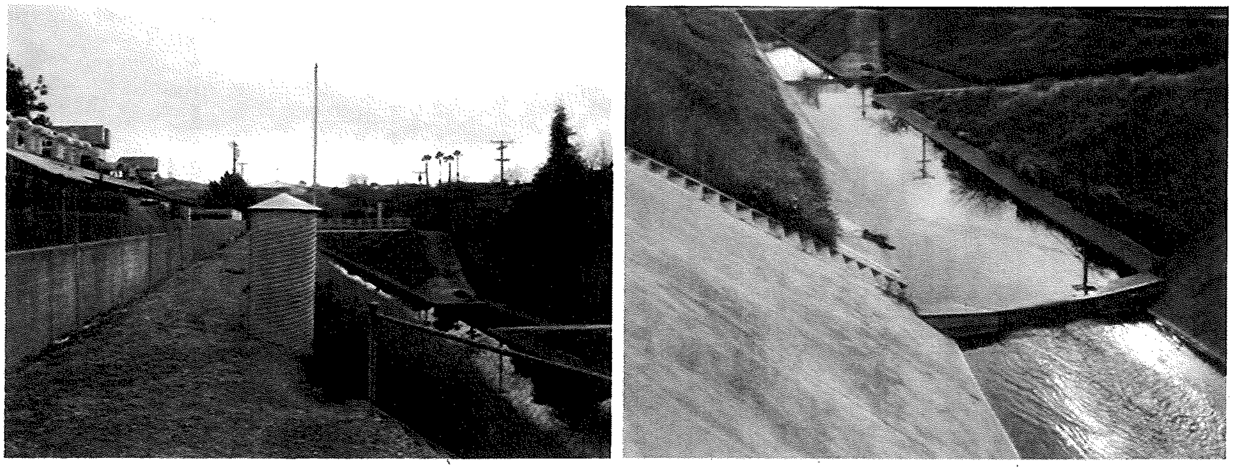
Figures 38a-38b Station 5067 – Los Gatos Creek below Lexington Reservoir

Figures 39a-39b Station 5069 – Llagas Creek below Chesbro Reservoir

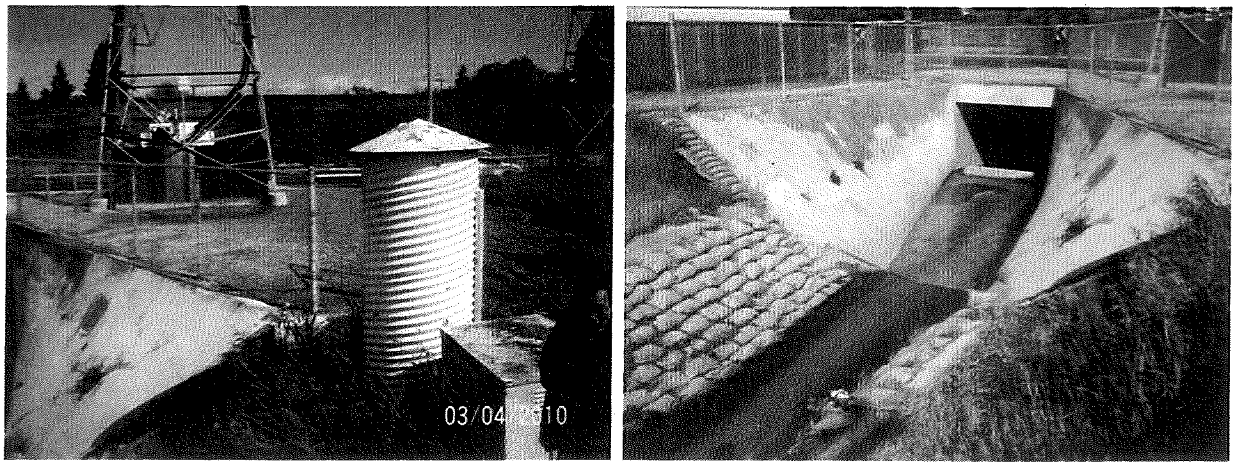


Figures 40a-40b Station 5070 – Alamitos Creek at Greystone Lane

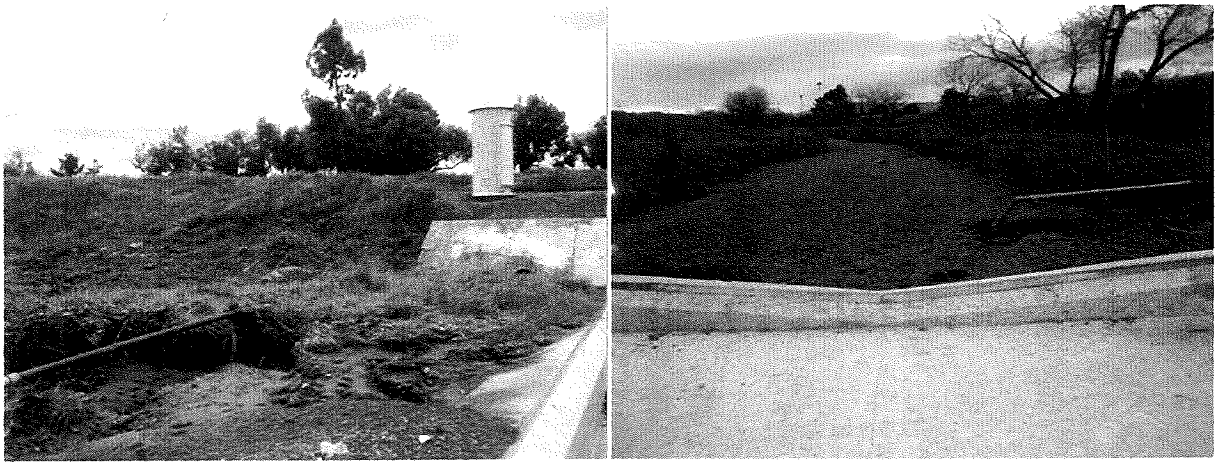
Figures 41a-41b Station 5072(5087) – Upper Penitencia Creek at Mabury



Figures 42a-42b Station 5073 – Canoas Creek at Almaden Expressway



Figures 43a-43b Station 5074 – Sunnyvale East Channel above Highway 101



Figures 44a-44b Station 5075 – Thompson Creek above Quimby Road

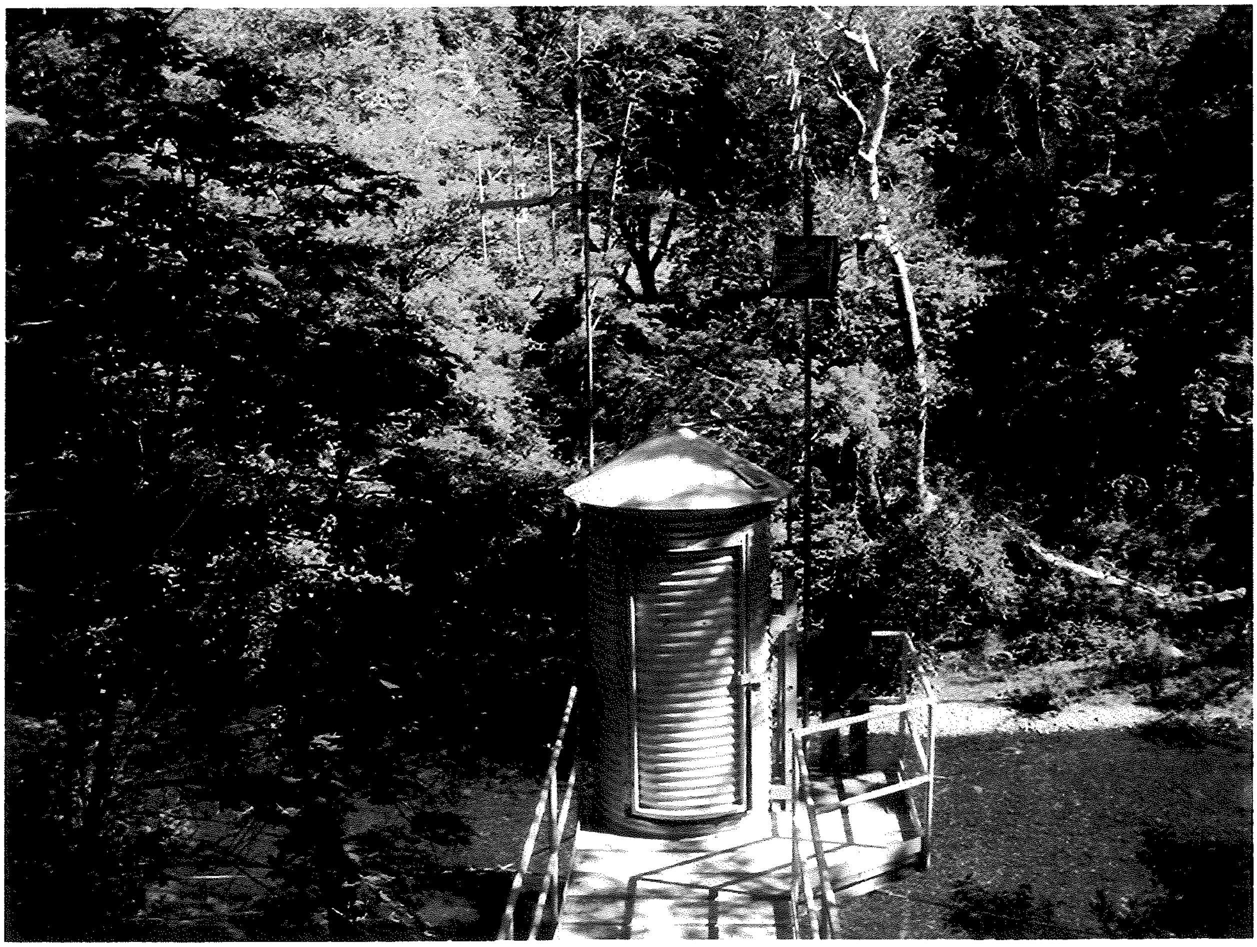
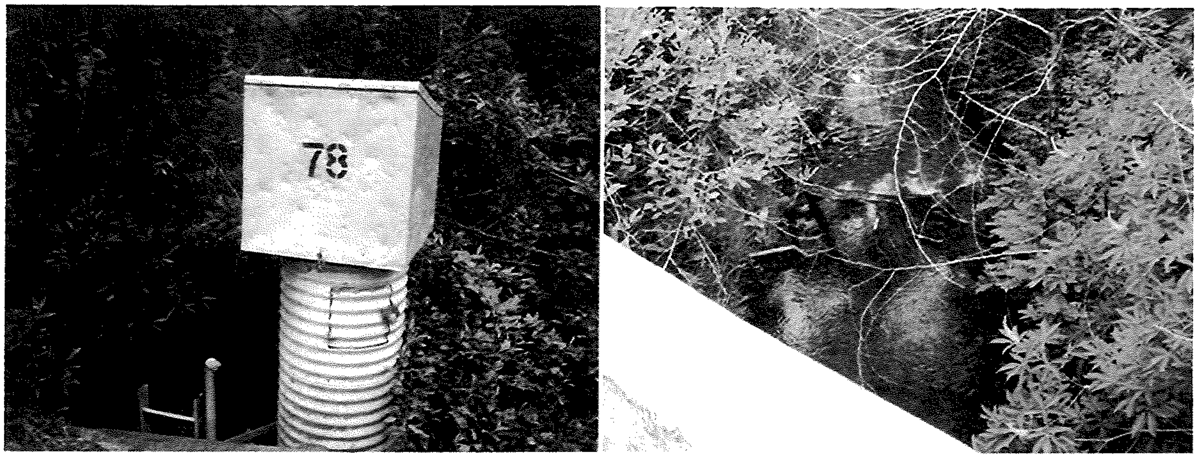
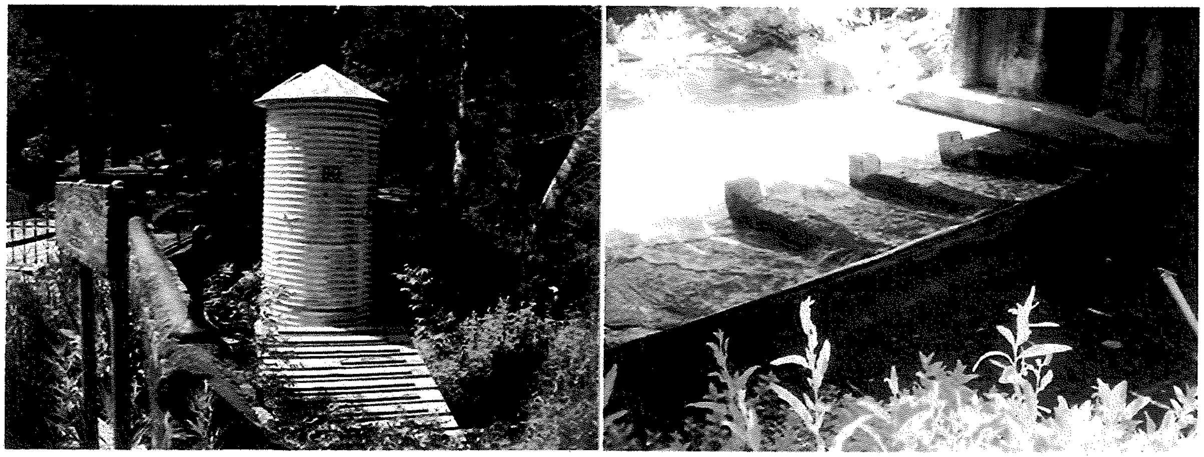


Figure 45 Station 5077 – Coyote Creek above Coyote Reservoir (USGS)



Figures 46a-46b Station 5078 – Bodfish Creek at Whitehurst Road

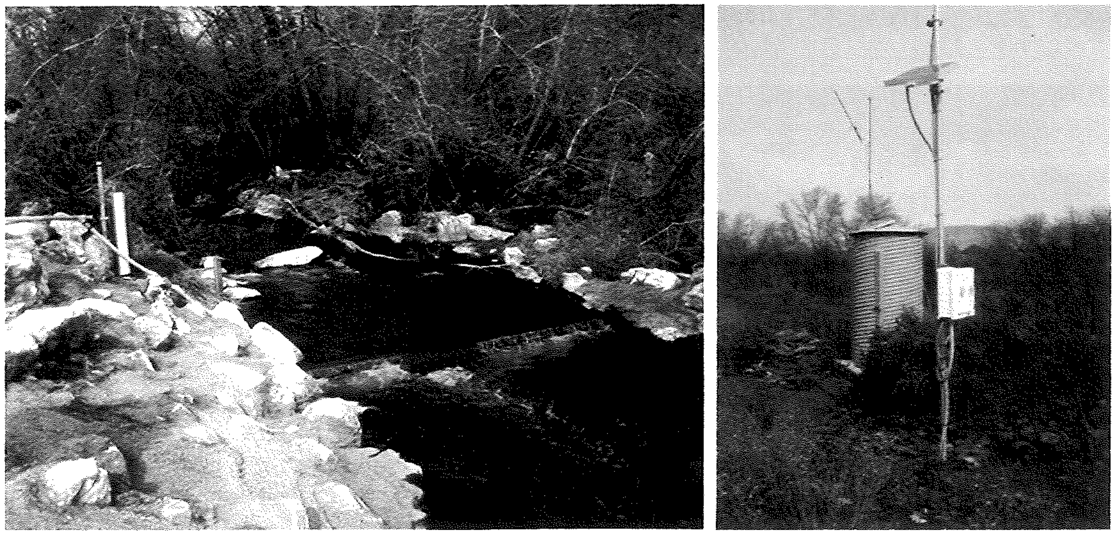


Figures 47a-47b Station 5080 – Llagas Creek above Chesbro Reservoir

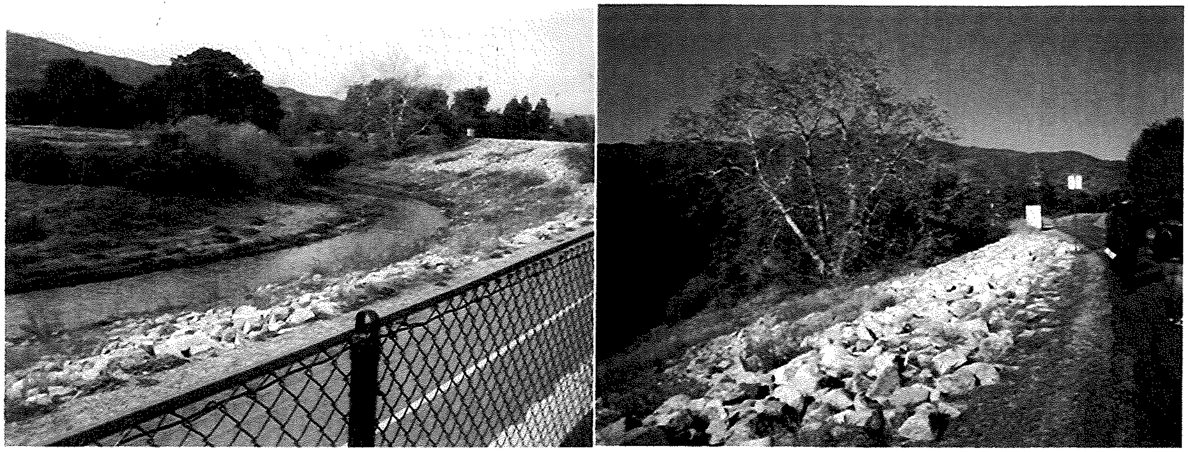
Figures 48a-48b Station 5082 – Coyote Creek above Boys Ranch (at Madrone)

Figures 49a-49b Station 5083 – Upper Penitencia Creek at Dorel Drive

Figures 50a-50b Station 5084 – Uvas Creek below Uvas Reservoir



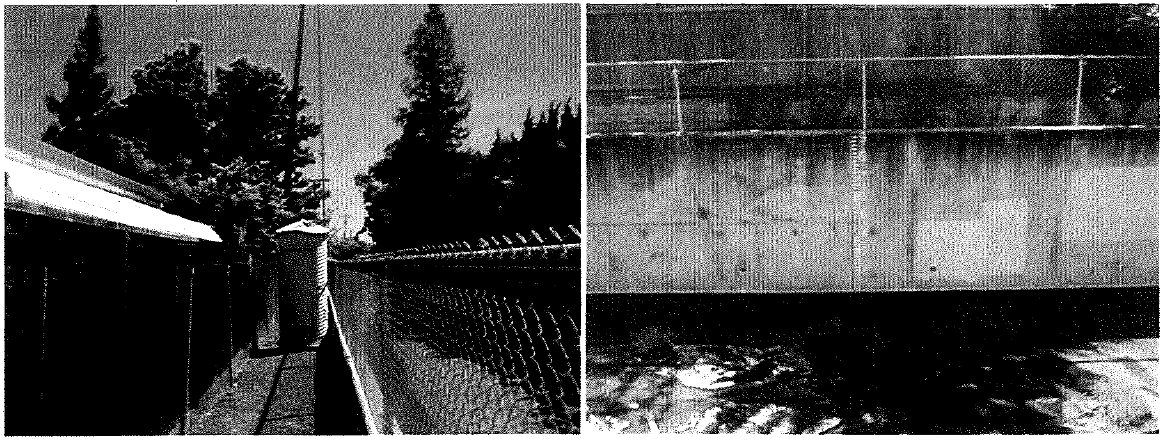
Figures 51a-51b Station 5085 – Llagas Creek at Southside Drive (USGS Station)



Figures 52a-52b Station 5086 – Uvas Creek upstream of Luchessa Avenue
[Note: See gage station towards far upper right]

Figures 53a-53b Station 5087(5072) – Upper Penitencia Creek at Mabury

Figures 54a-54b Stations 5089/5090 – Coyote Creek Percolation Pond



Figures 55a-55b Station 5091 – Adobe Creek at Middlefield Road

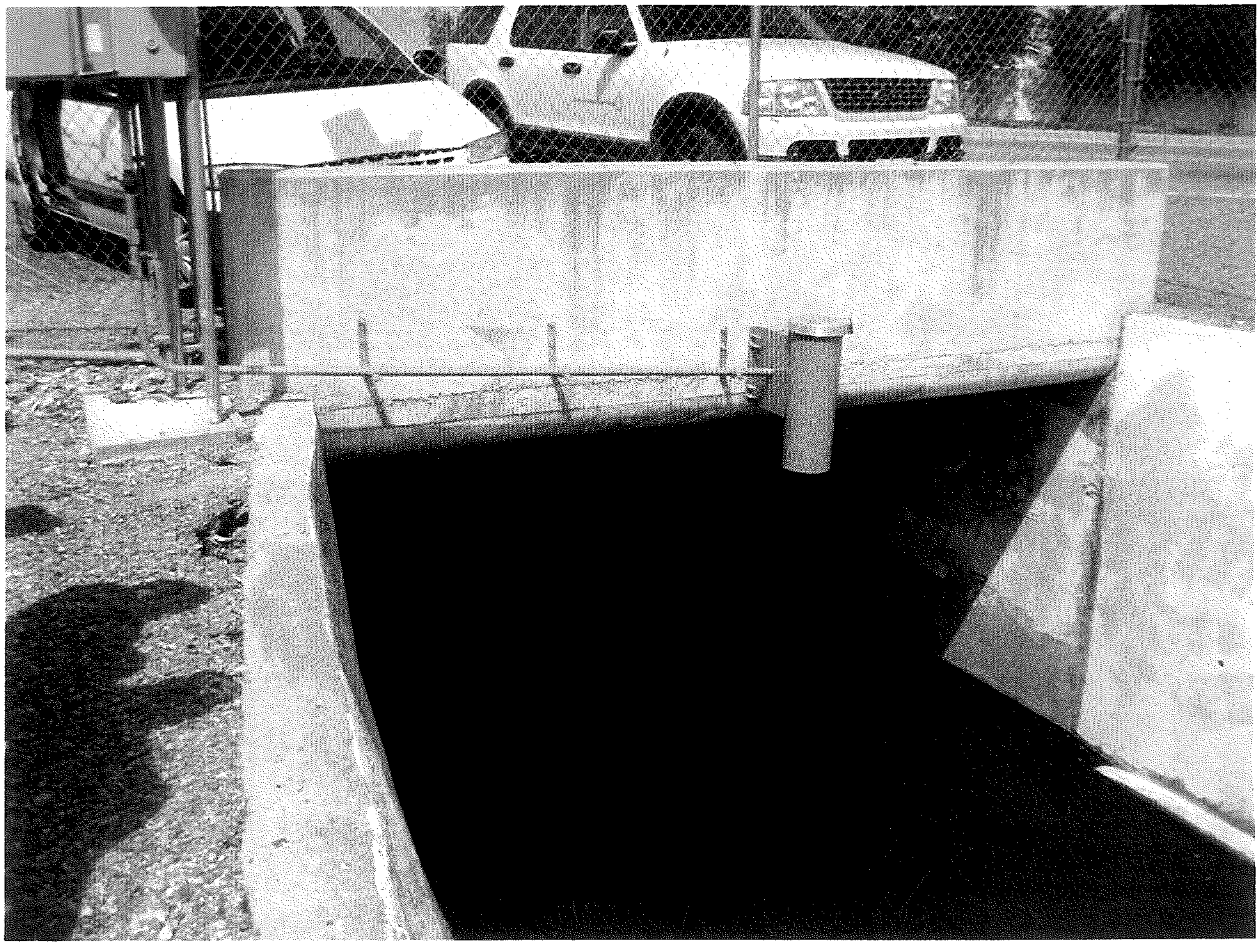


Figure 56 Station 5092 – Upper Silver Creek at Yerba Buena Avenue

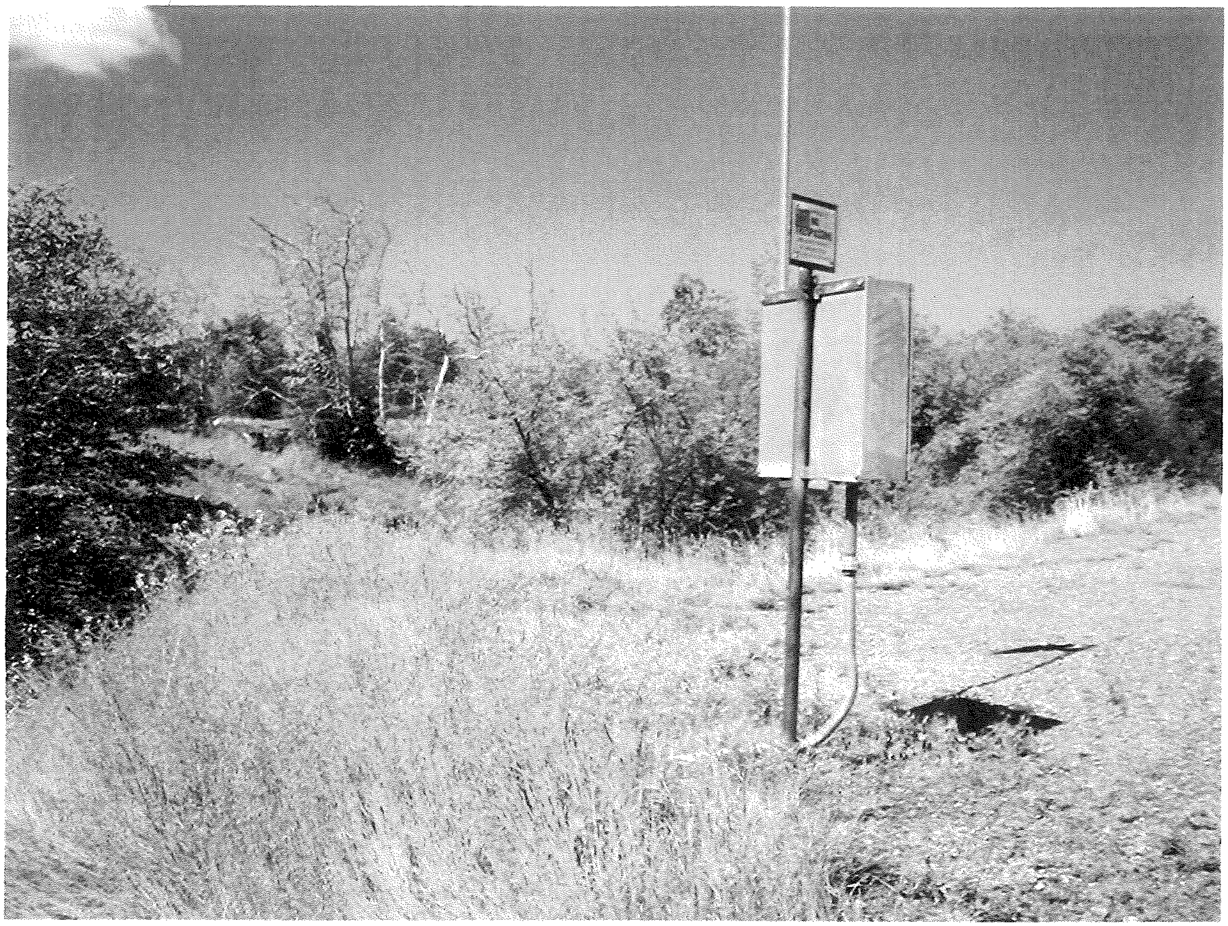
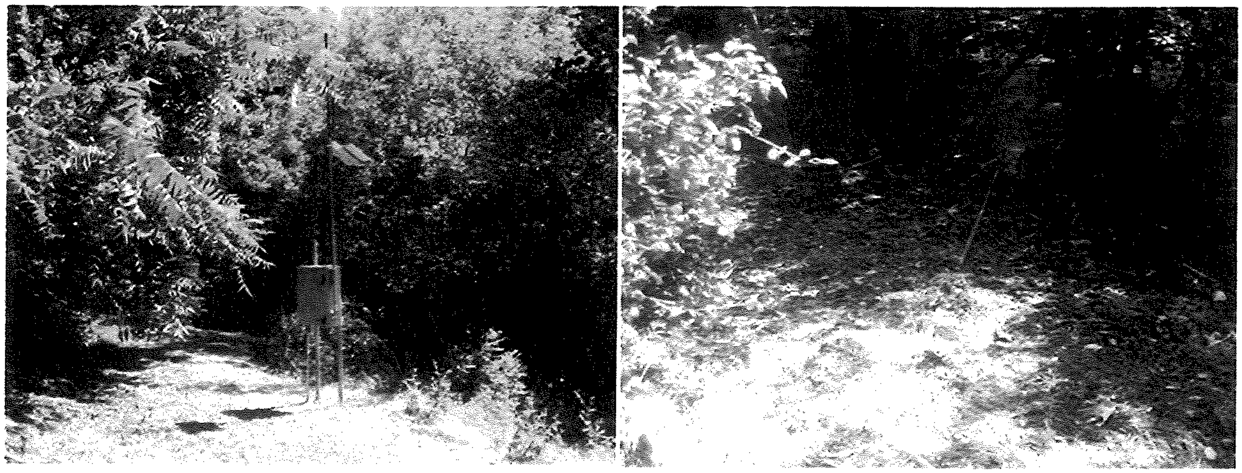
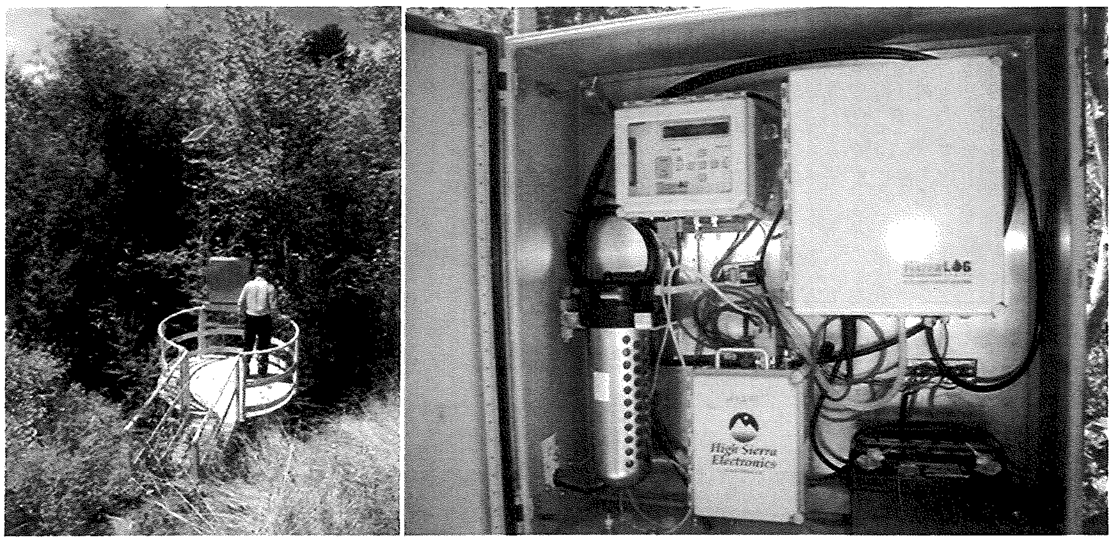


Figure 57 Station 5093 – Guadalupe River upstream of Branham Lane

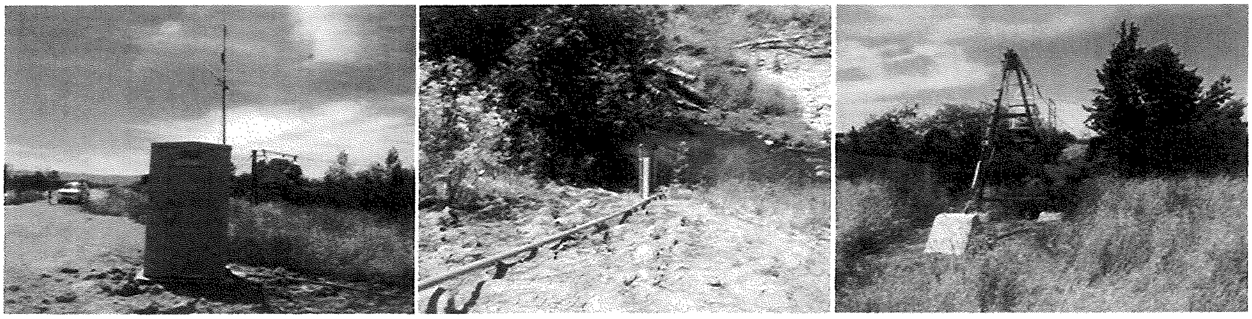


Figures 58a-58b Station 5094 – Coyote Creek at Piercy Road



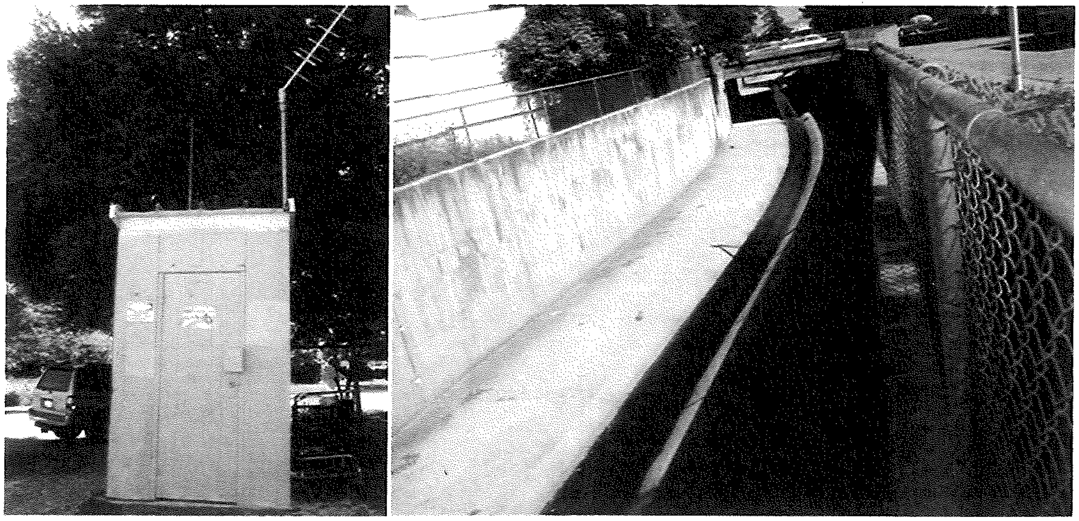
Figures 59a-59b Station 5095 – Los Gatos Creek upstream of Bascom Avenue

Figures 60a-60b Station 5096 – Saratoga Creek near Saratoga (USGS)

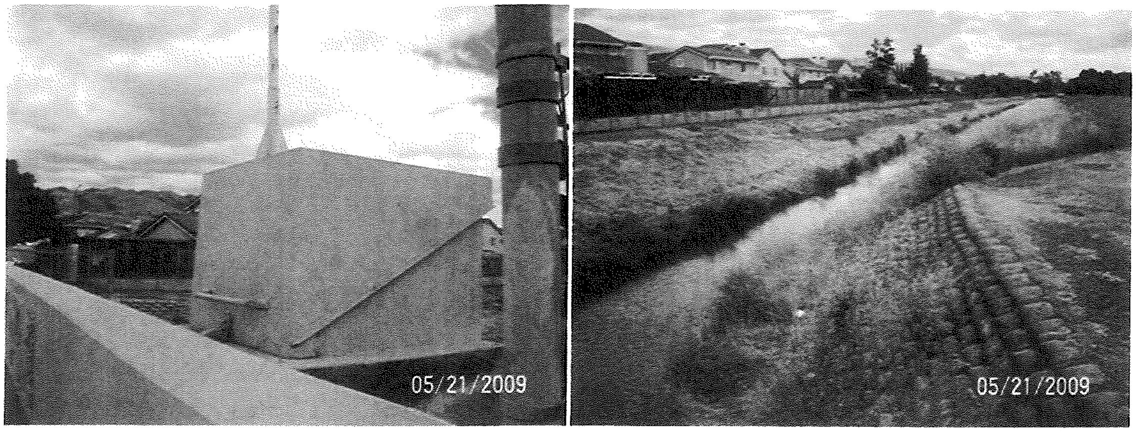


Figures 61a-61c Station 5097 Coyote Creek at Highway 237 (USGS)

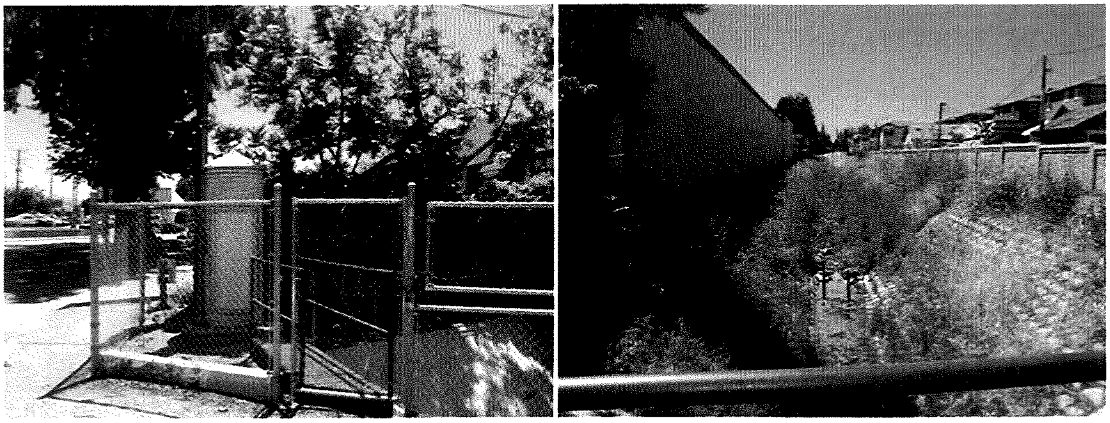
Figures 62a-62b Station 5098 – Coyote Creek at East William Street



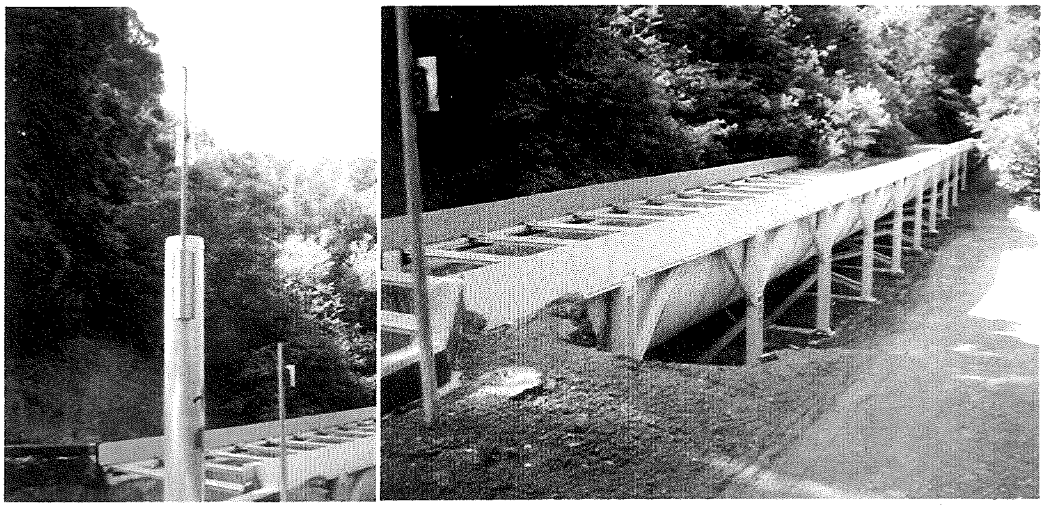
Figures 63a-63b Station 5101 – Matadero Creek at El Camino Real (USGS)



Figures 64a-64b Station 5102 – Lower Silver Creek at Ocala Avenue



Figures 65a-65b Station 5103 – El Camino Real Storm Drain at Willow Avenue



Figures 66a-66b Station 5104 – Almaden-Calero Canal at flume

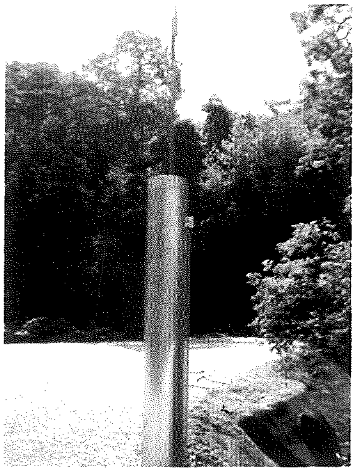
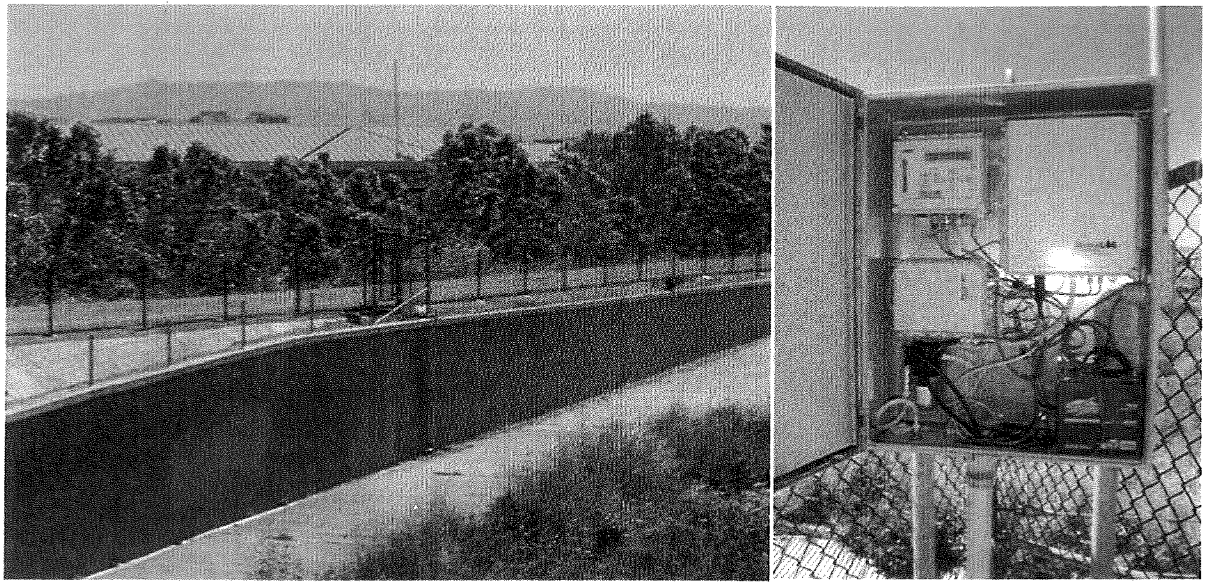
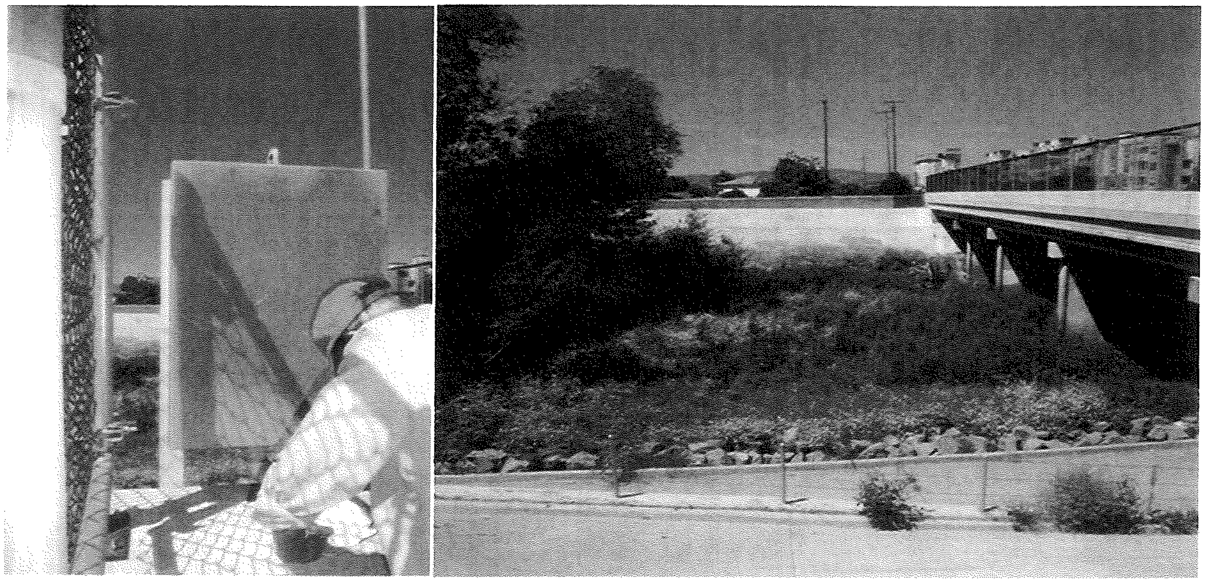


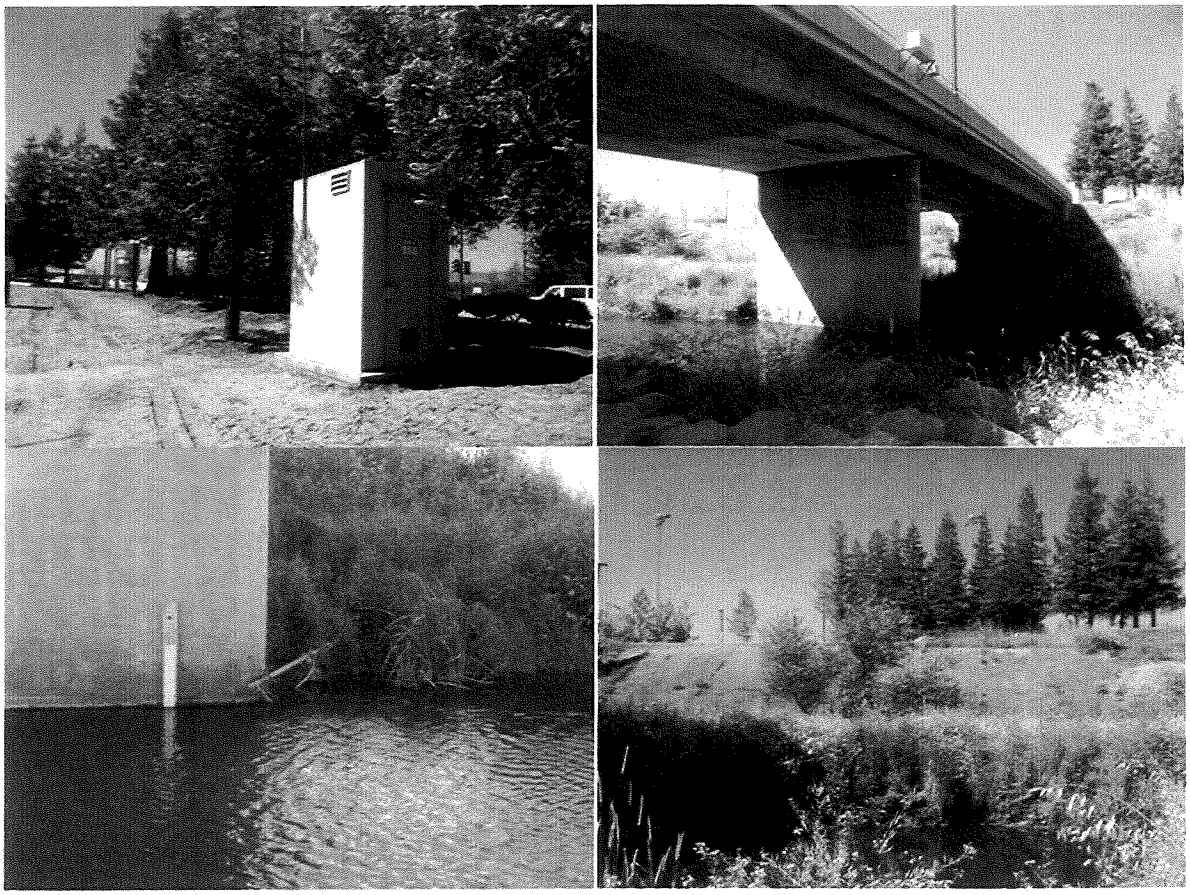
Figure 67 Station 5105 – Almaden-Calero Canal downstream of Bertram Road



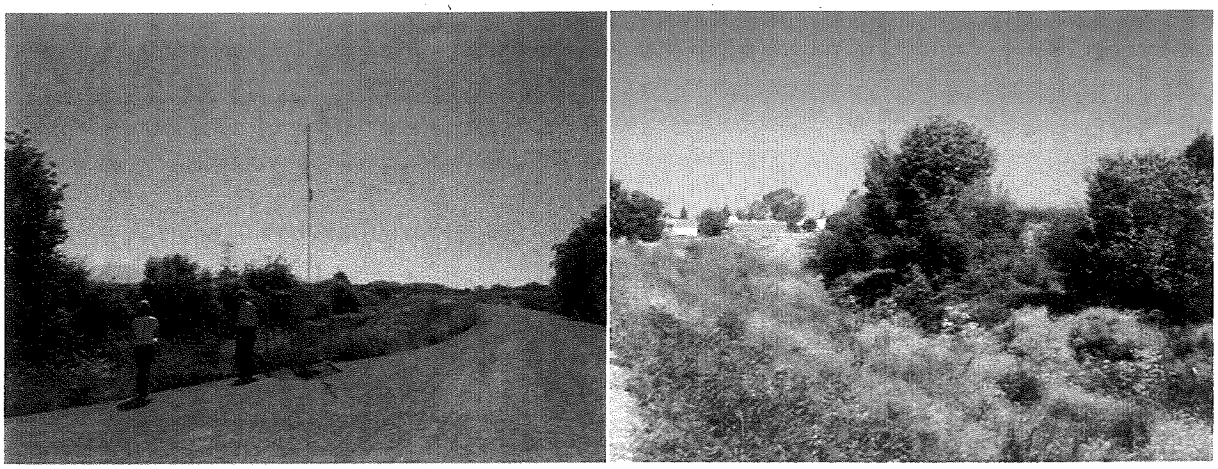
Figures 68a-68b Station 5107 – Guadalupe River at Tasman Drive



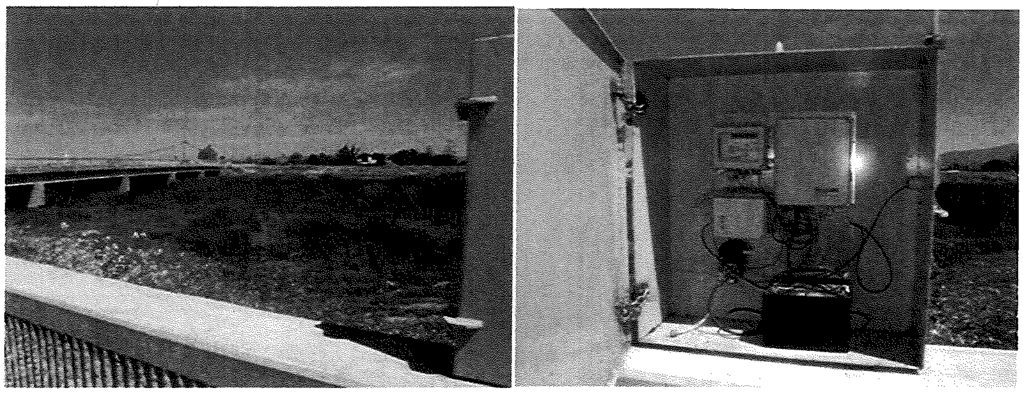
Figures 69a-69b Station 5108 – Guadalupe River at Montague Expressway



Figures 70a-70d Station 5109 – Guadalupe River at Highway 101 (USGS)



Figures 71a-71b Station 5110 – Guadalupe River at Trimble Road



Figures 72a-72b Station 5111 – Guadalupe River at Gold Street

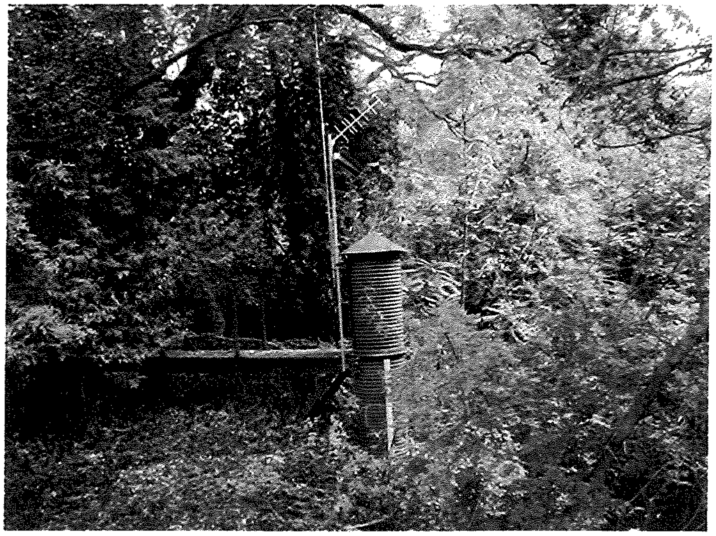
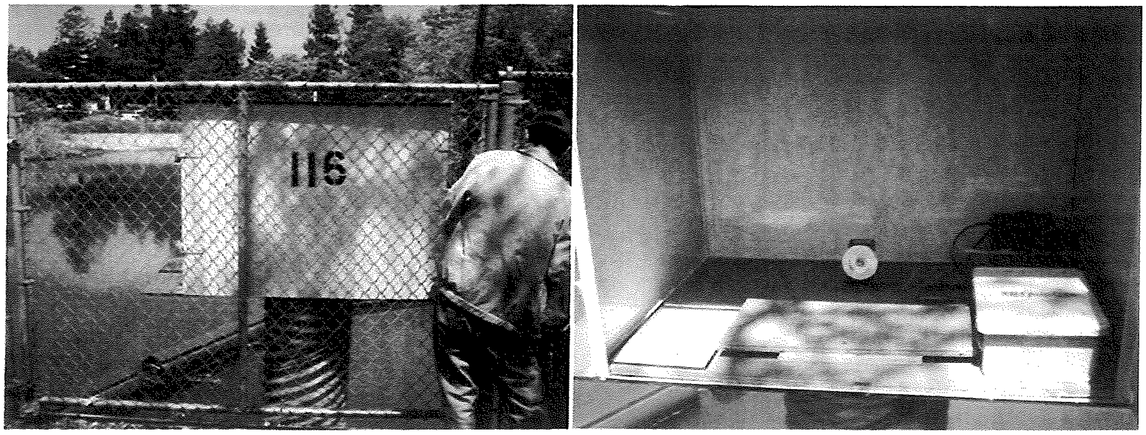


Figure 73 Station 5112 – San Francisquito Creek at Stanford (USGS)



Figures 74a-74b Station 5116 – Los Gatos Creek at Kirk Dam

PHOTOS OF ACTIVE PRECIPITATION GAGES

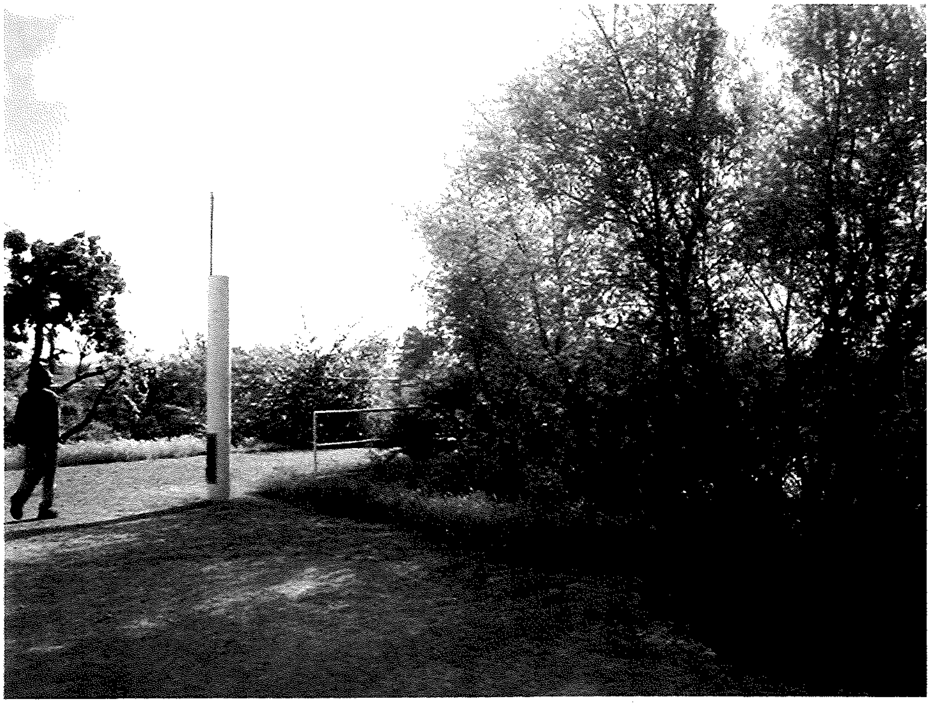


Figure 75 Station 6001 – Alamitos

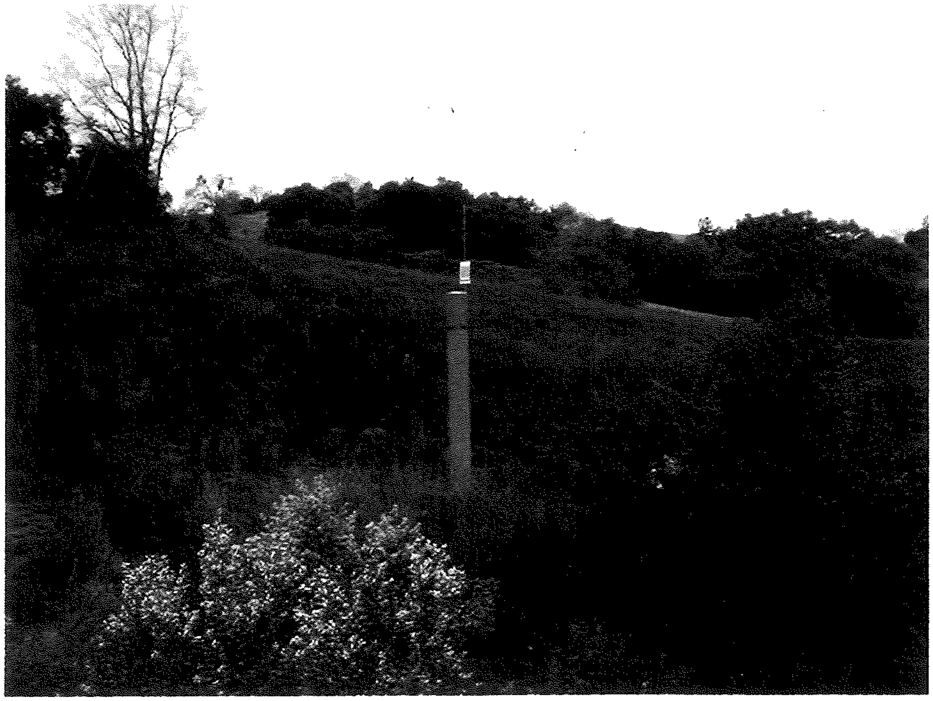


Figure 76 Station 6004 – Almaden Watershed

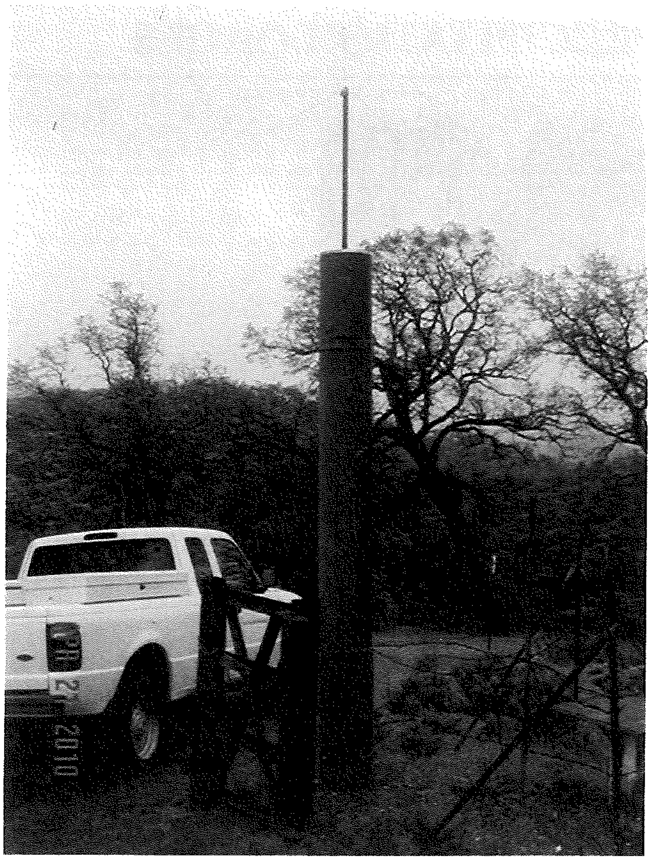


Figure 77 Station 6008 – Biel Ranch

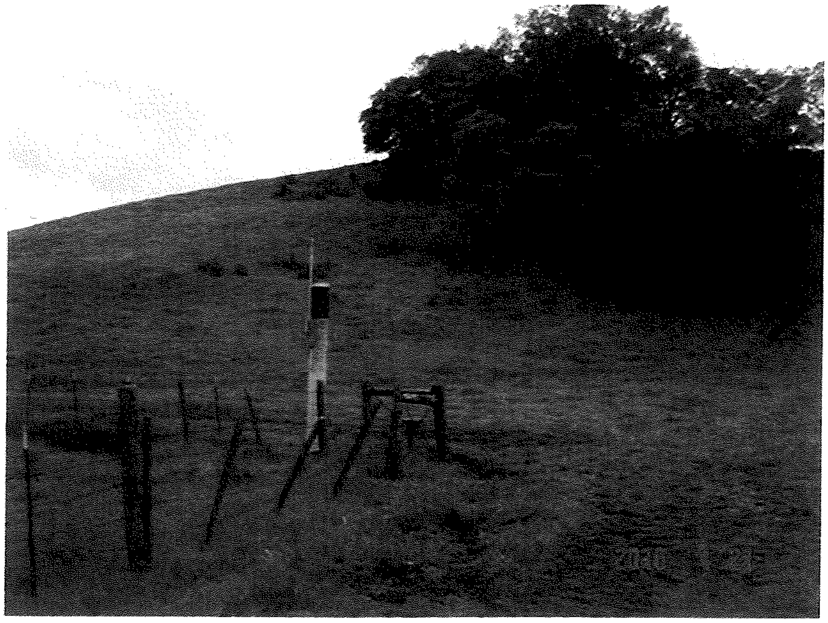


Figure 78 Station 6015 – Castro Valley

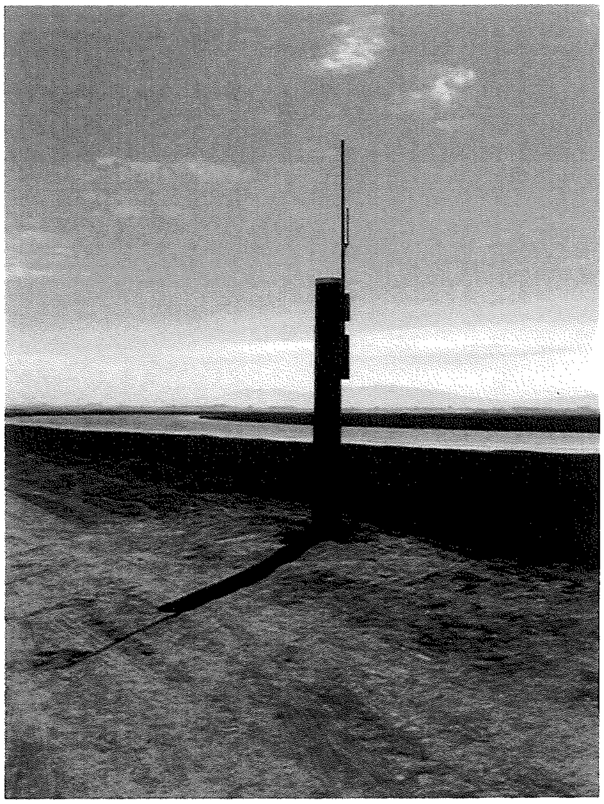
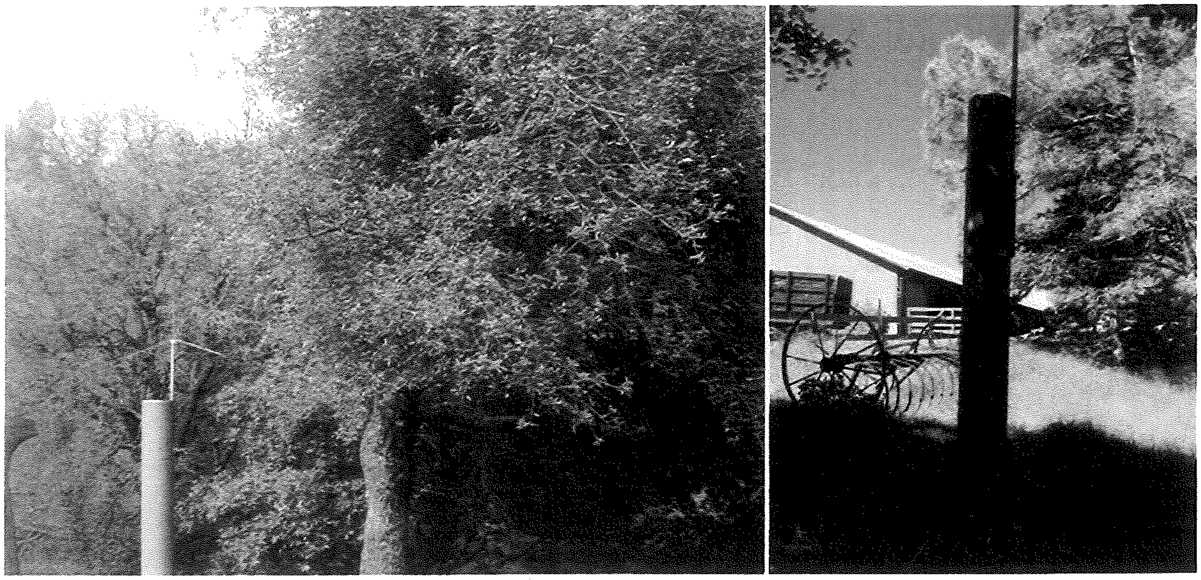


Figure 79 Station 6016 – Guadalupe Slough



Figures 80a-80b Station 6017 – Coe Park

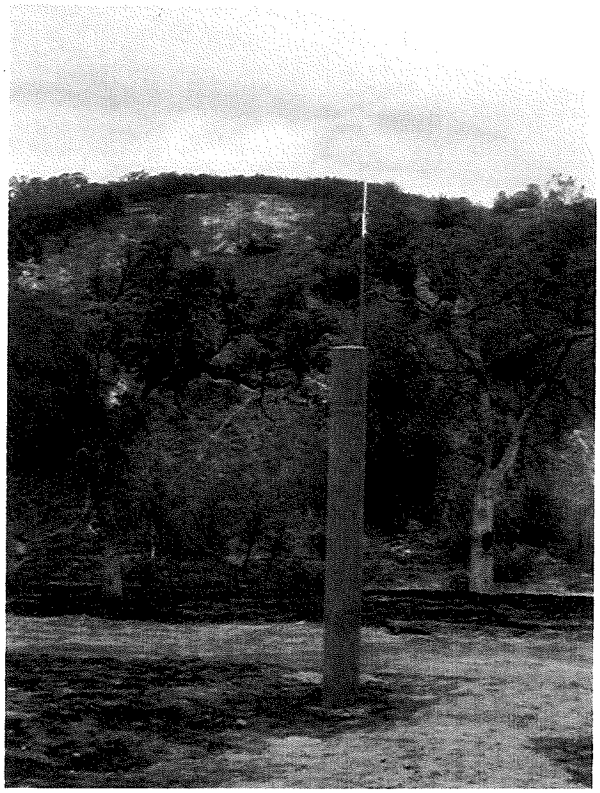


Figure 81 Station 6018 – Coit Ranch

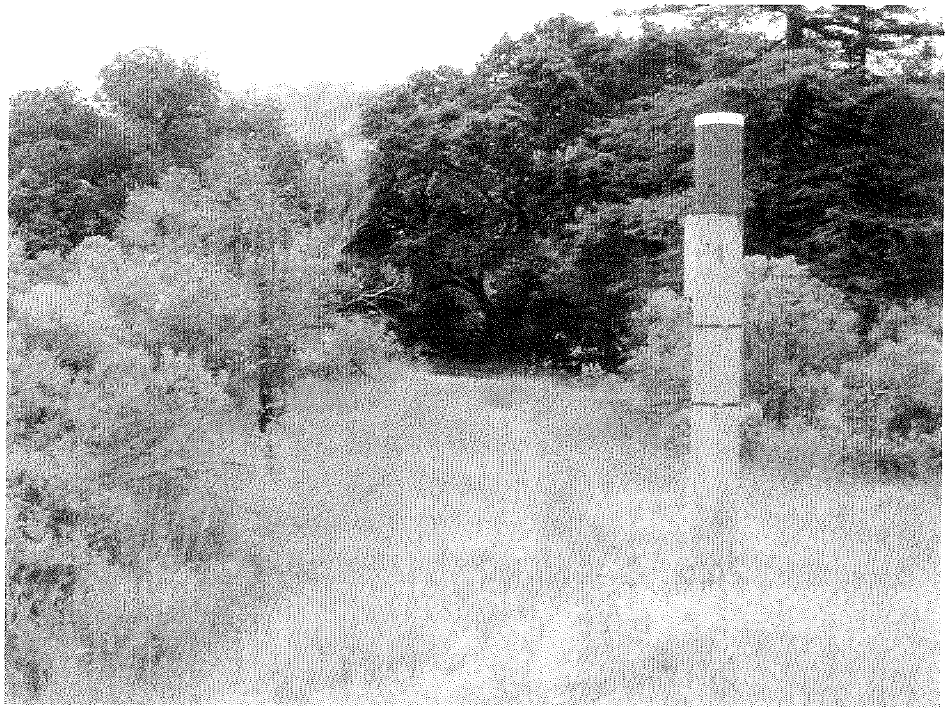


Figure 82 Station 6021 – Coyote Reservoir

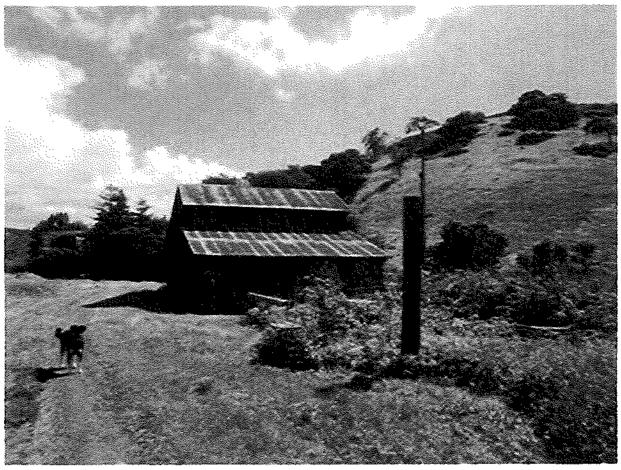


Figure 83 Station 6023 – Curtner Ranch

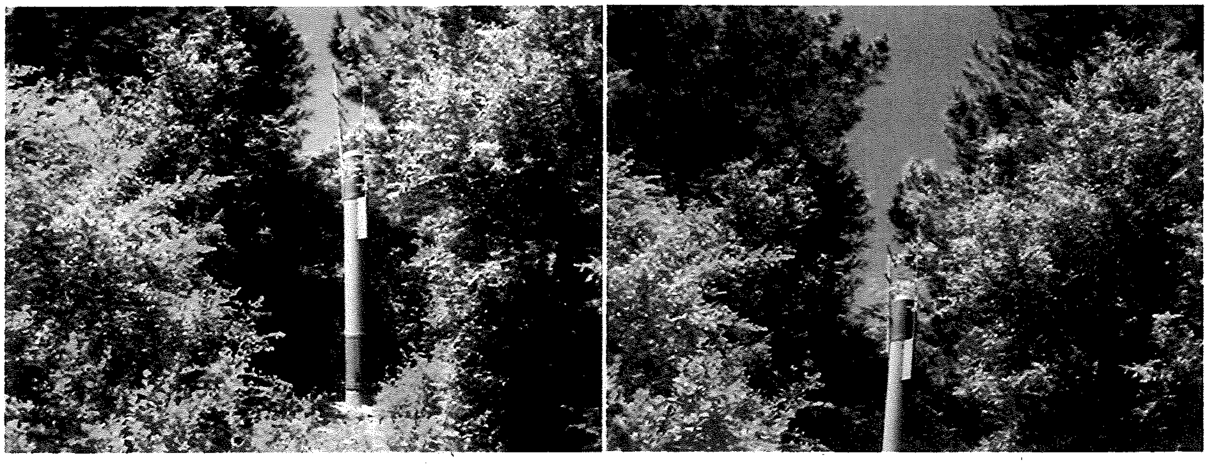


Figure 84a-84b Station 6024 – Dahl Ranch

Figure 85 Station 6034 – Haskins Ranch

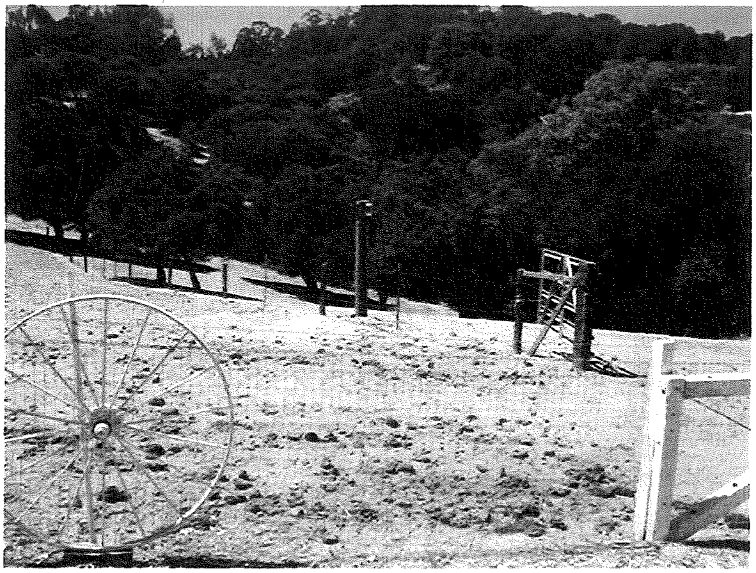


Figure 86 Station 6036 – Johnson Ranch

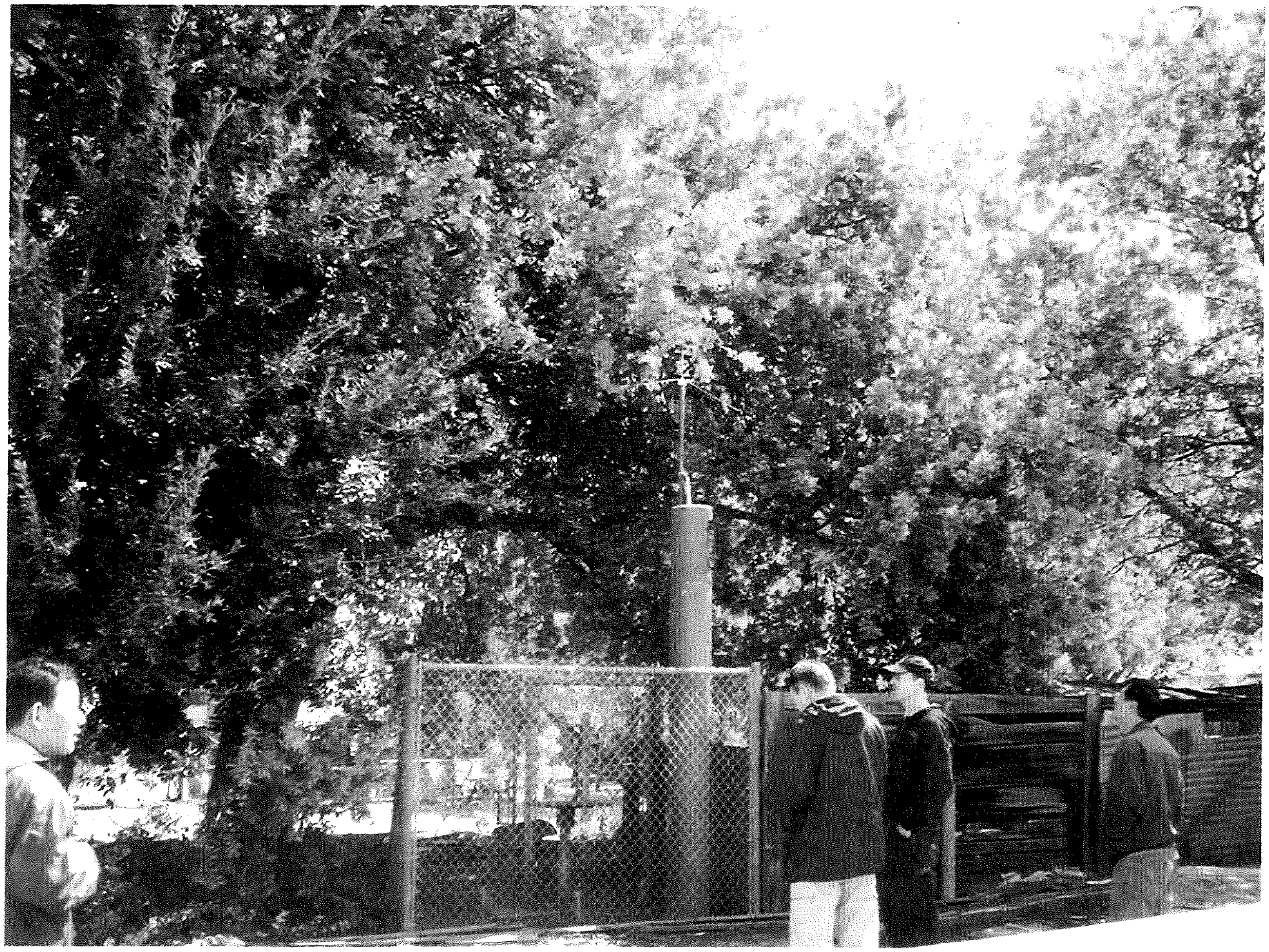


Figure 87 Station 6037 – Laguna Seca

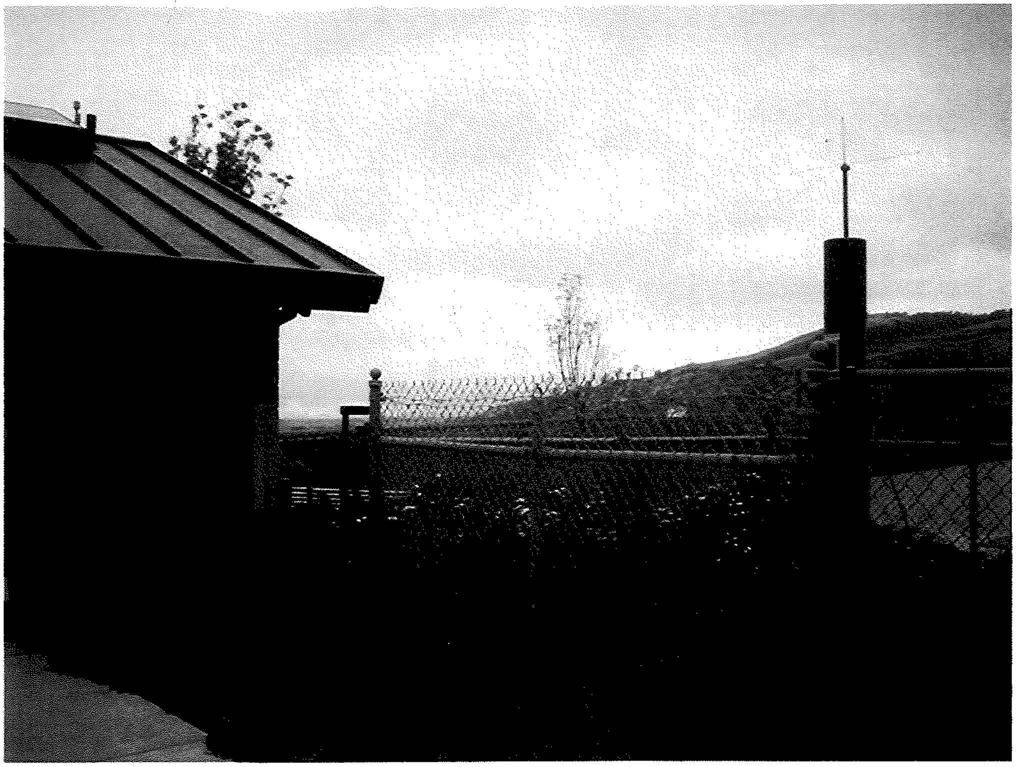


Figure 88 Station 6041 – Leroy Anderson Dam

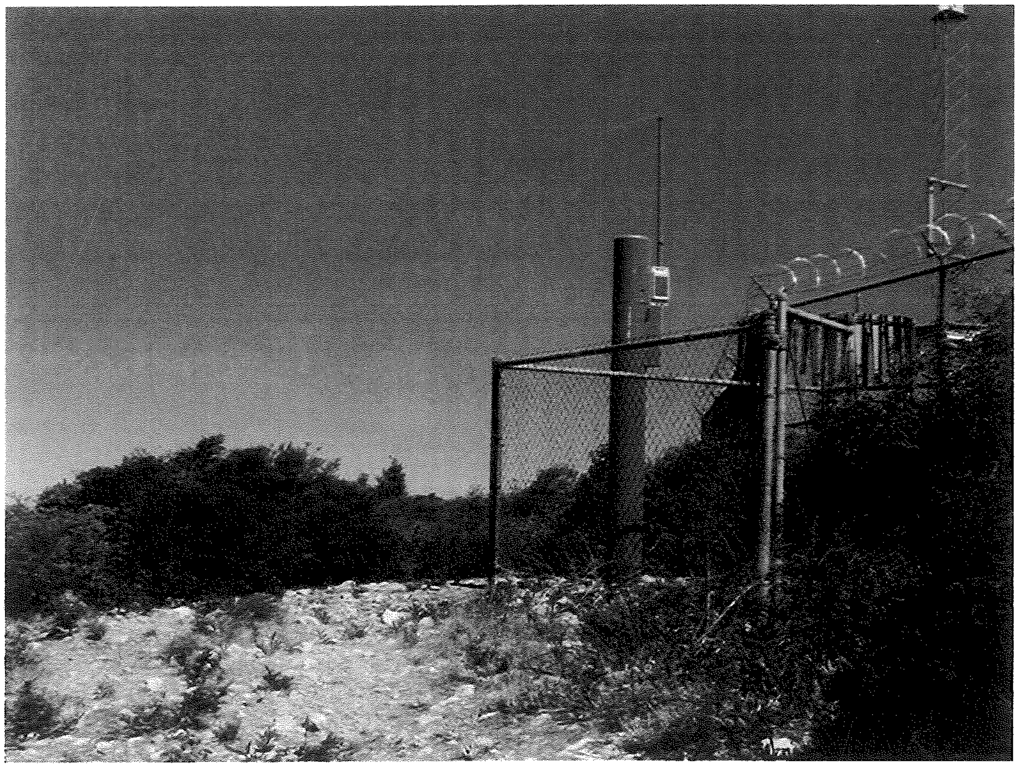
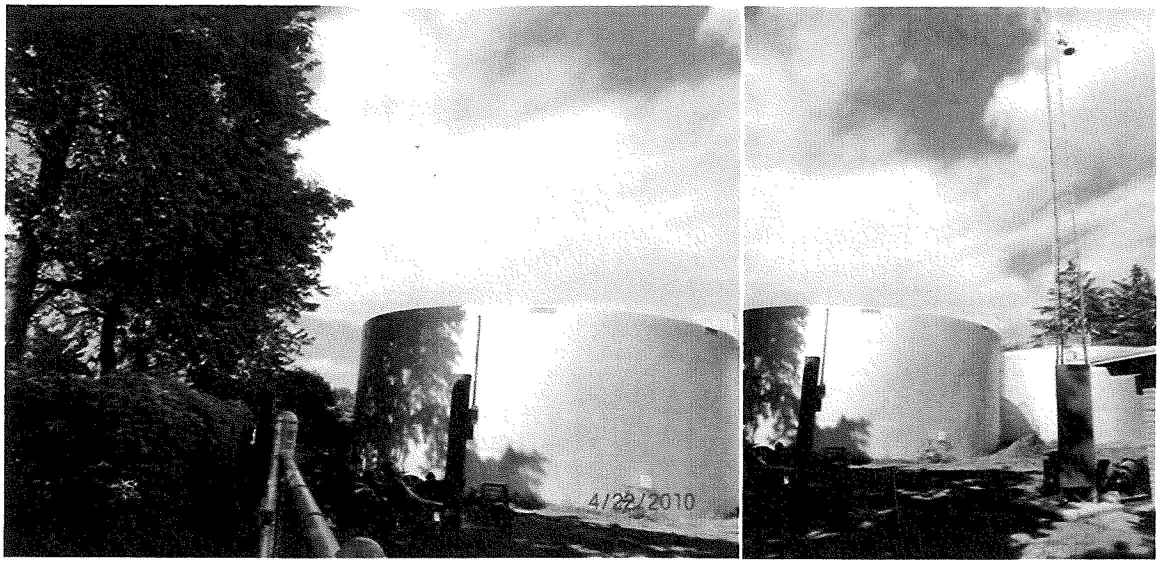


Figure 89 Station 6044 – Loma Prieta



Figures 90a-90b Station 6048 – Sunnyvale Hamilton Water Treatment Plant

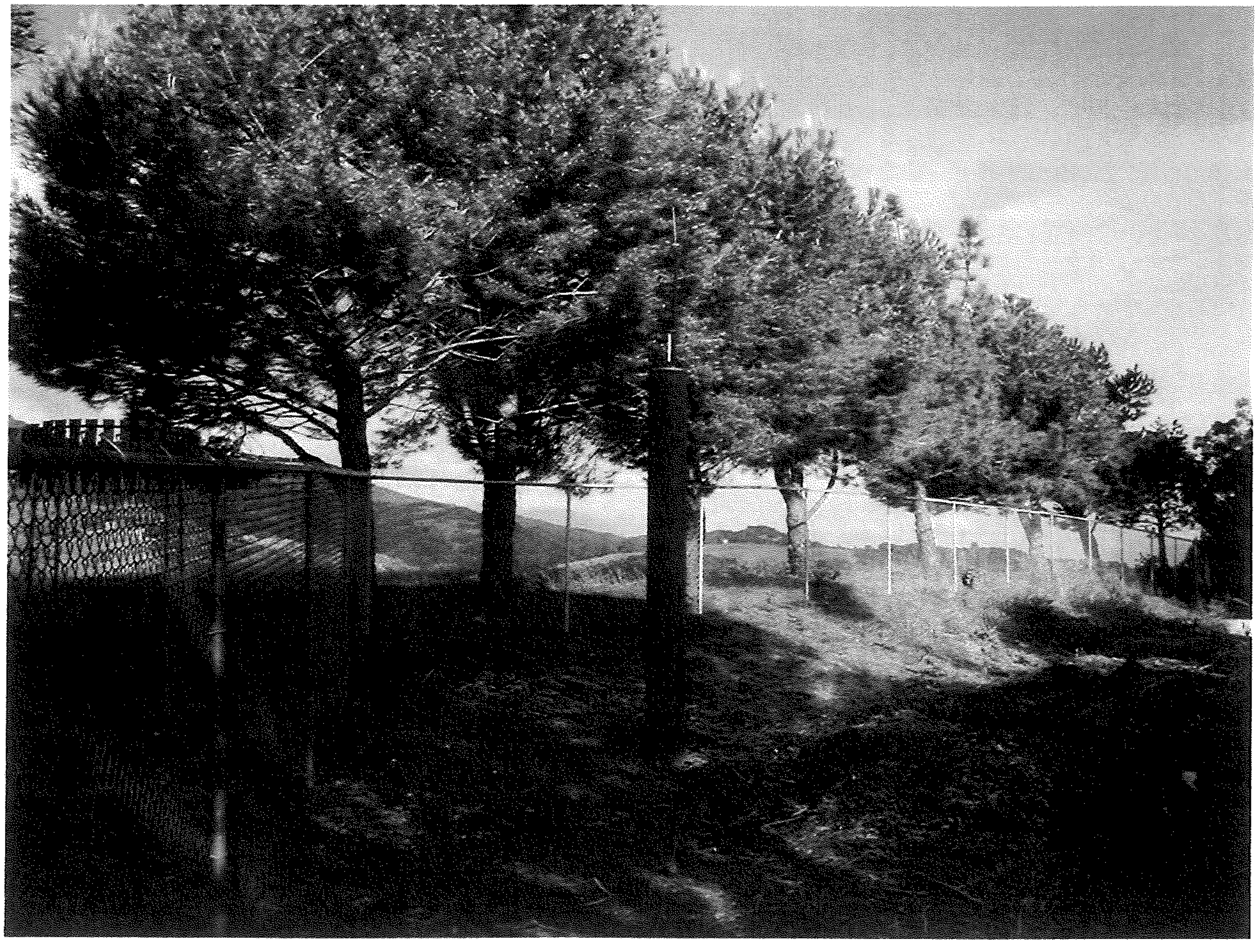


Figure 91 Station 6053 – Maryknoll

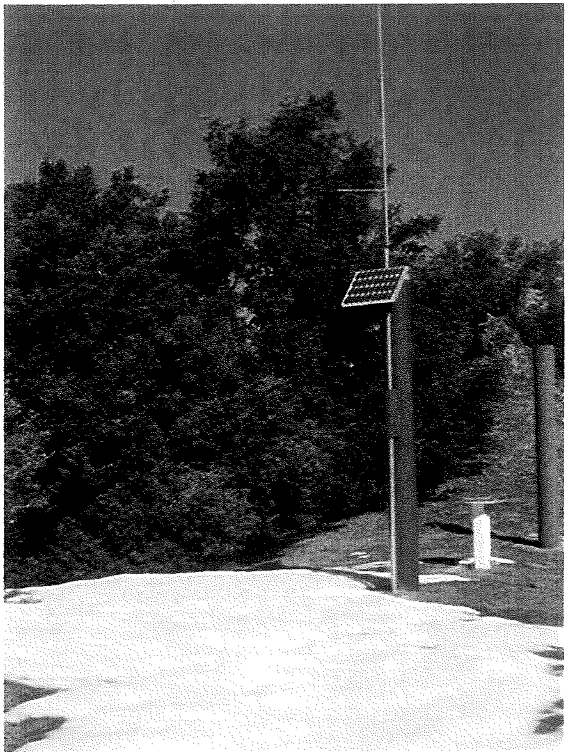


Figure 92 Station 6067 – Mount Hamilton

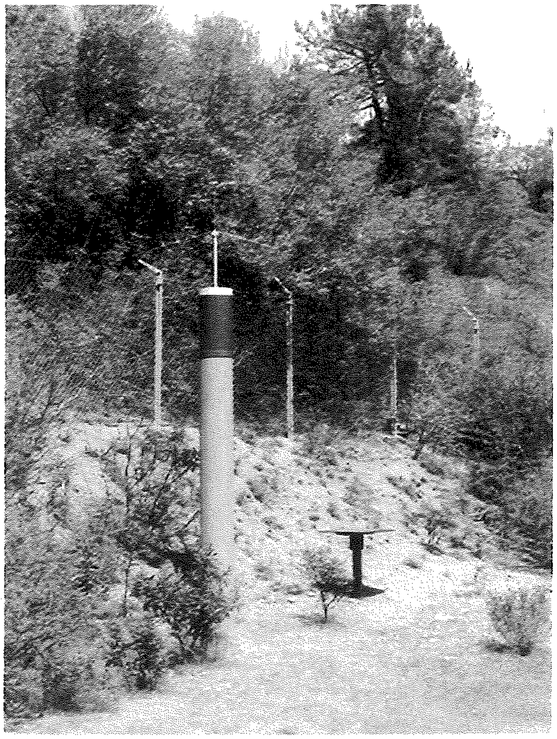


Figure 93 Station 6069 – Mount Umunhum

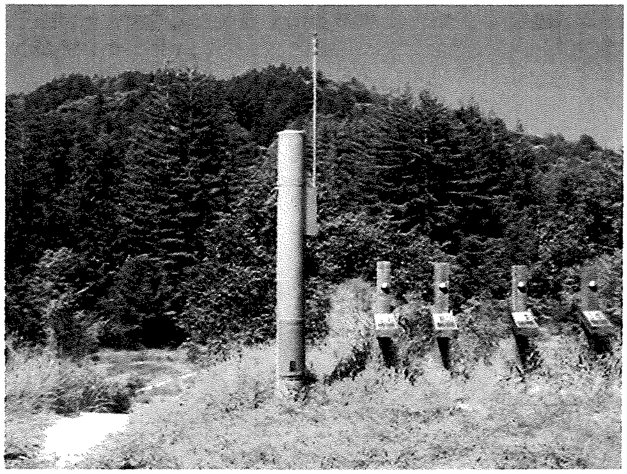


Figure 94 Station 6077 – Valley Christian

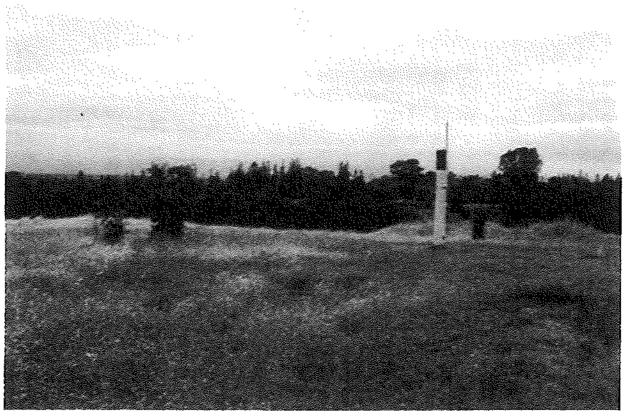


Figure 95 Station 6079 – Rinconada Water Treatment Plant

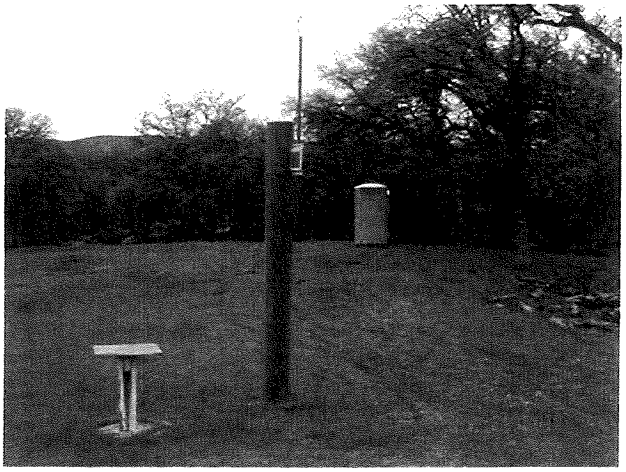
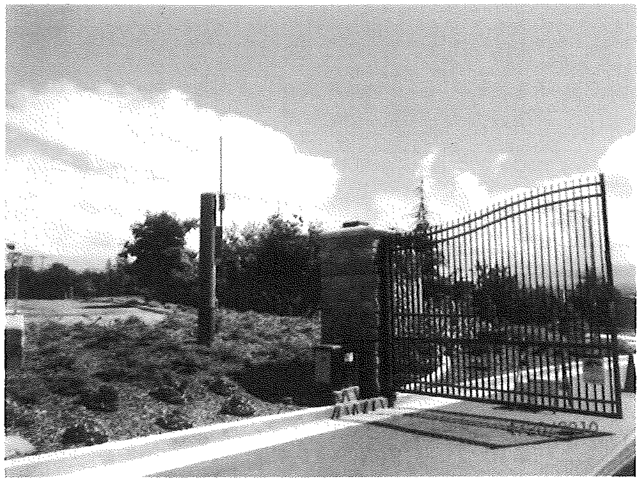
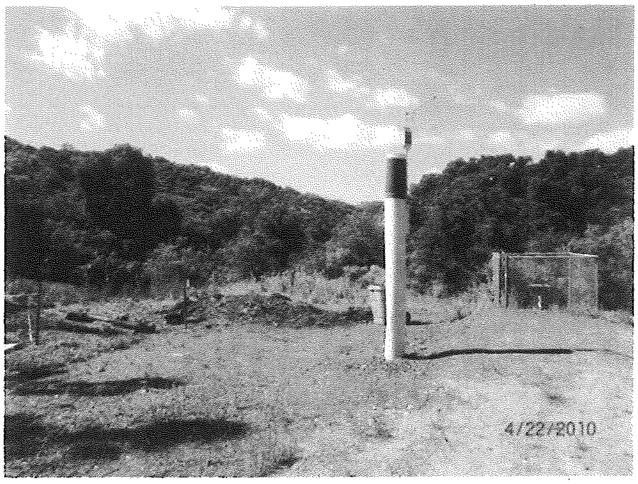


Figure 96 Station 6098 – Shanti Ashrama



4/22/2010

Figure 97 Station 6099 – Penitentia Water Treatment Plant



4/22/2010

Figure 98 Station 6100 – Stevens Creek Reservoir

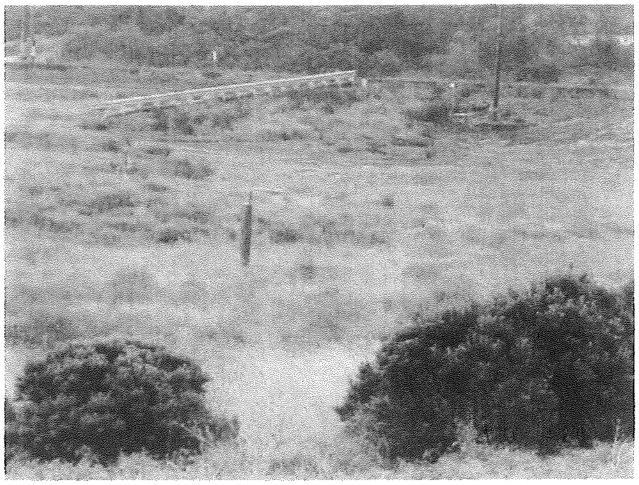


Figure 99 Station 6102 – UTC

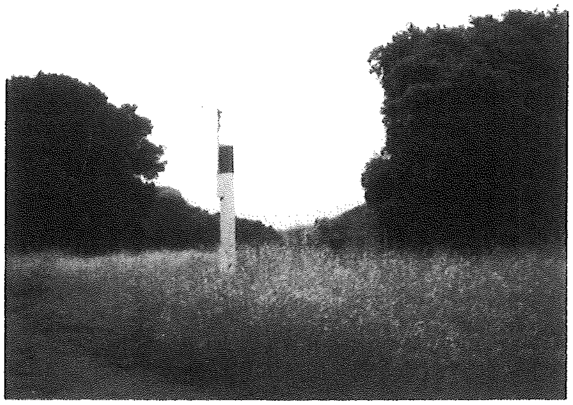


Figure 100 Station 6104 – Uvas Reservoir

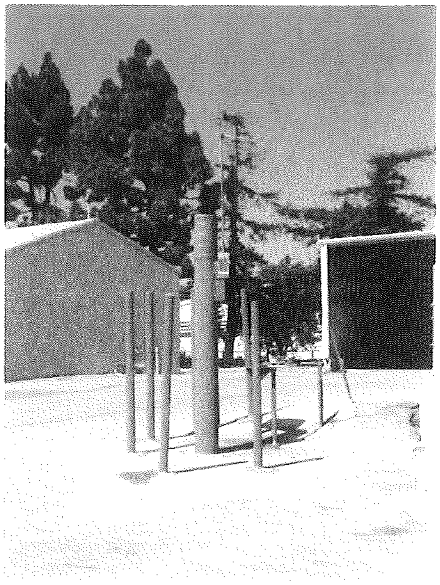
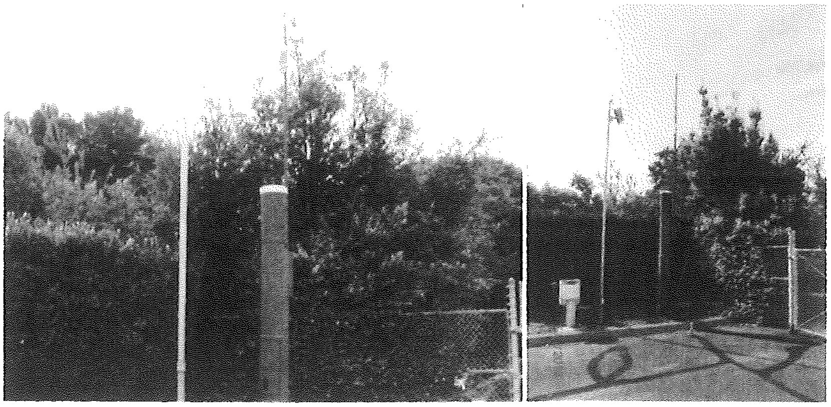


Figure 101 Station 6108 – West Yard



Figures 102a-102b Station 6121 – Mountain View Corporation Yard

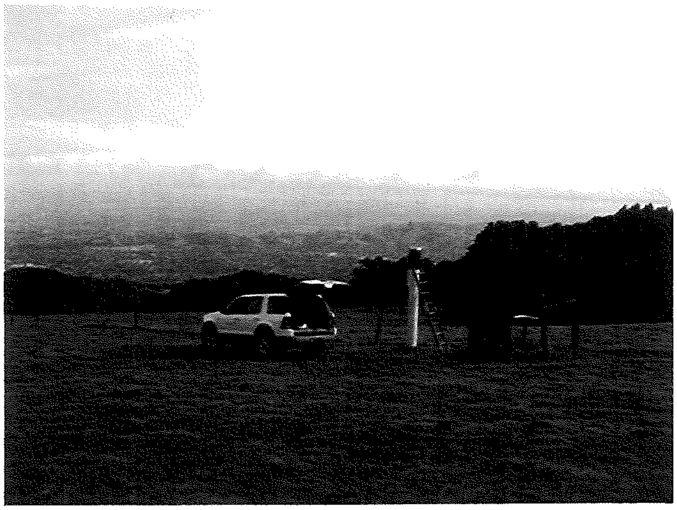


Figure 103 Station 6123 – Guadalupe Watershed

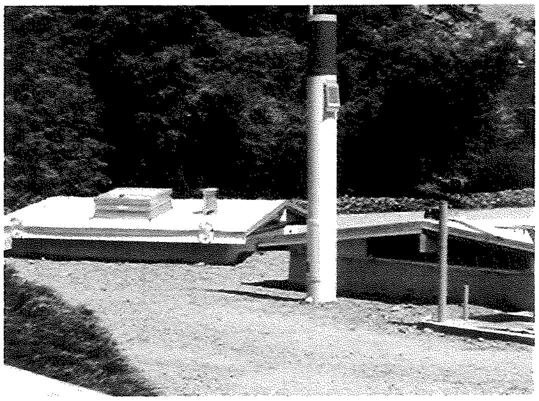


Figure 104 Station 6125 – Vasona Pump Station

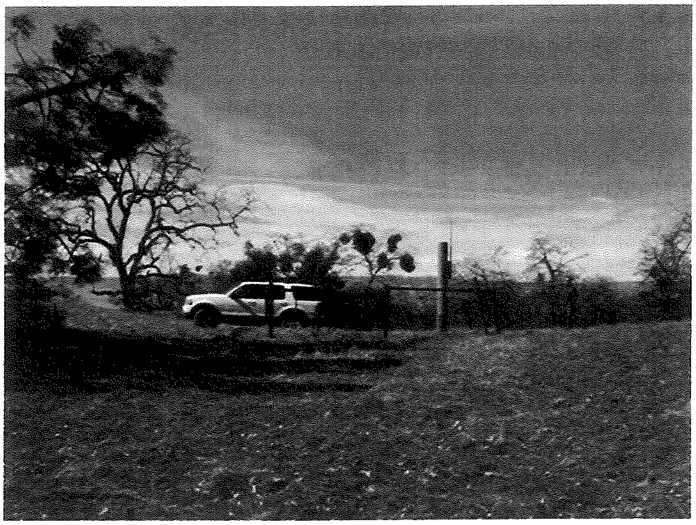


Figure 105 Station 6127 – Cow Ridge

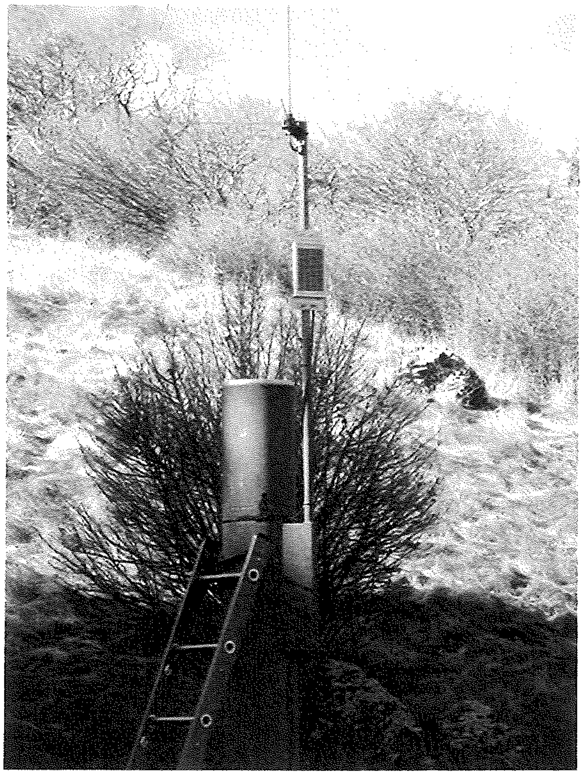


Figure 106 Station 6128 – Calero Watershed

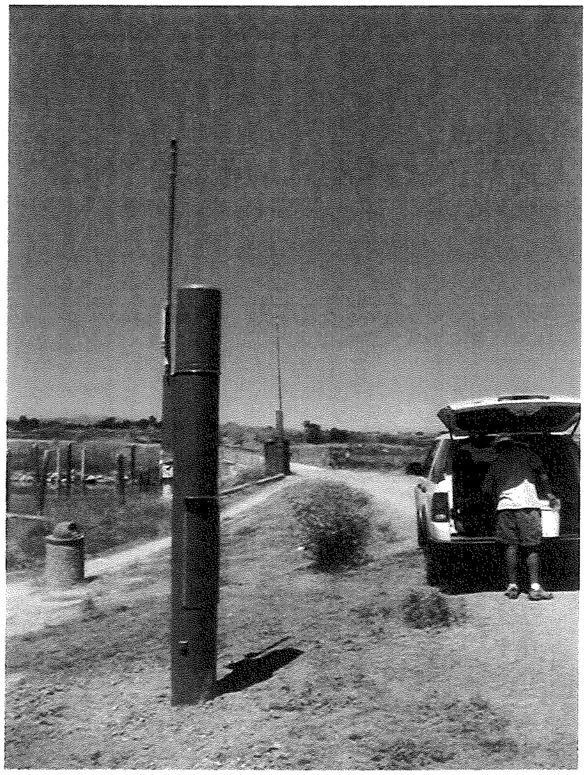


Figure 107 Station 6129 – Palo Alto Reclamation Plant

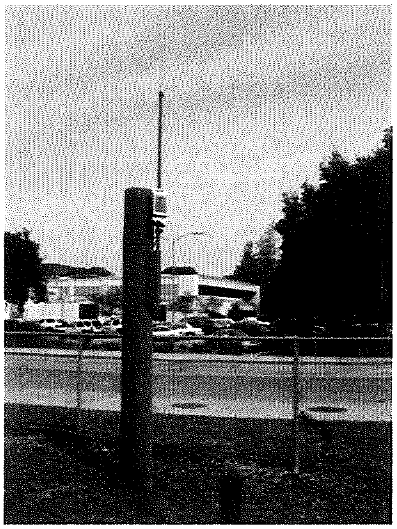


Figure 108 Station 6131 – City of San Jose

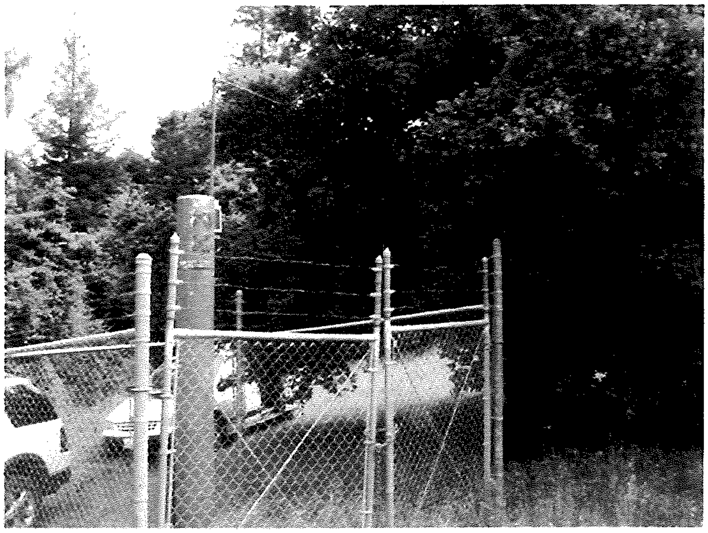


Figure 109 Station 6132 – Evergreen

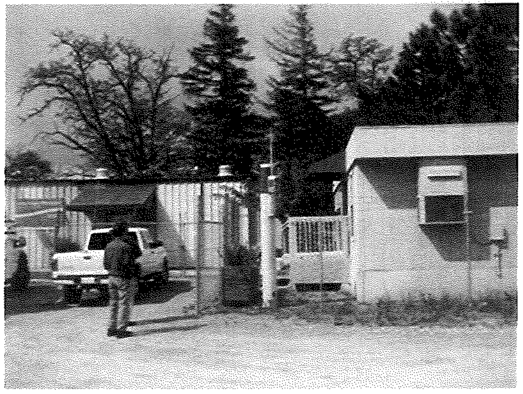


Figure 110 Station 6134 – Church Avenue Ponds

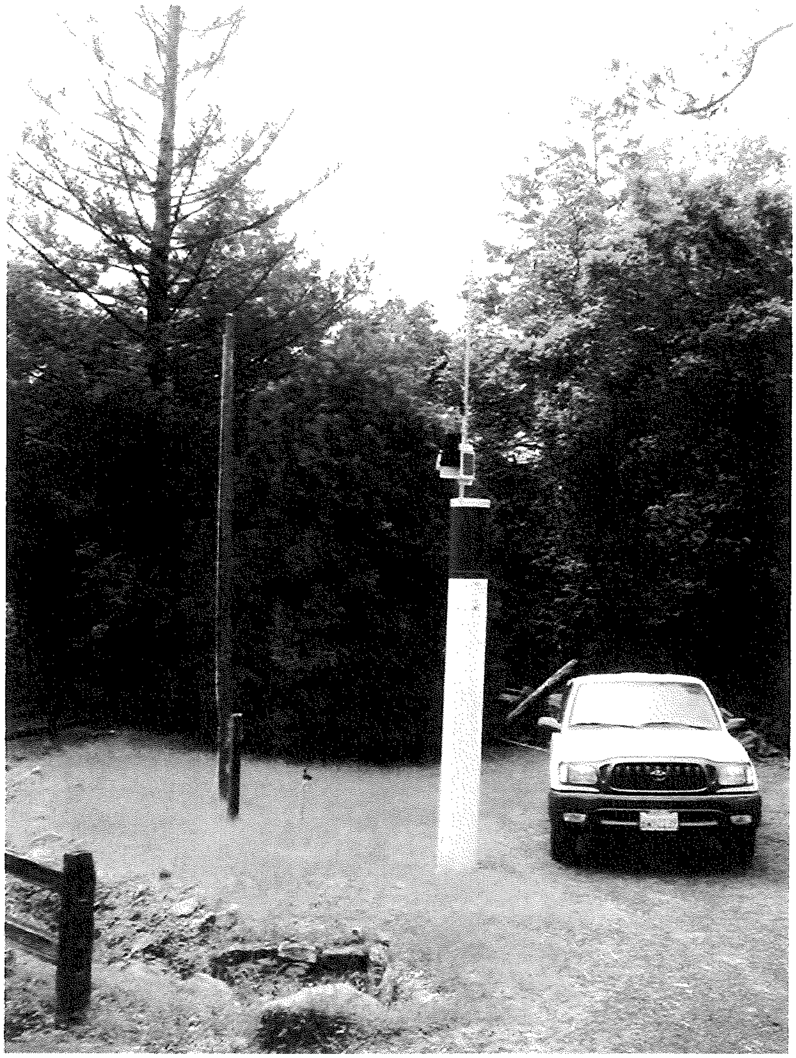


Figure 111 Station 6135 – Uvas Canyon County Park

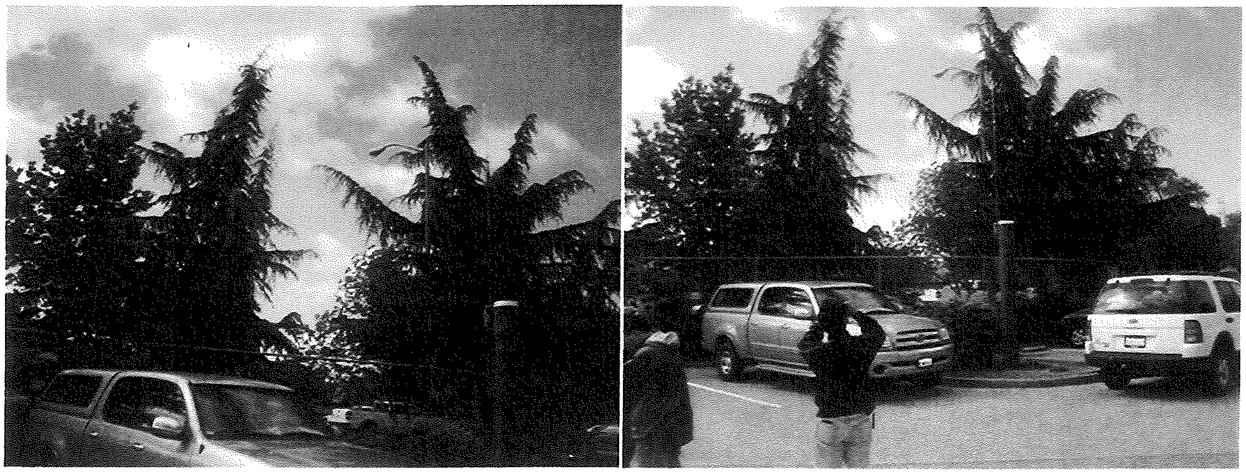


Figure 112 Station 6136 – Morgan Hill

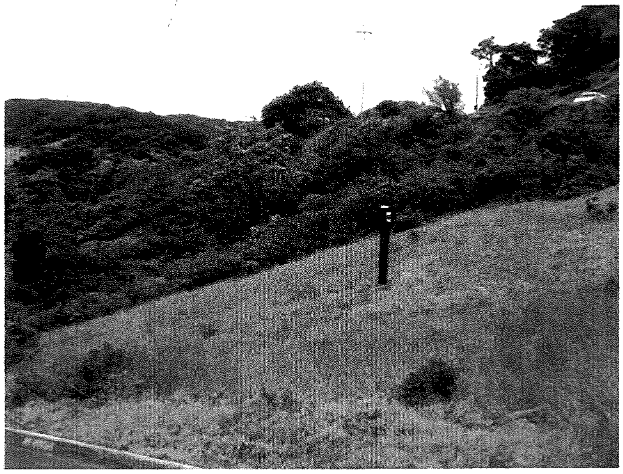


Figure 113 Station 6138 – Banjo Point